ICE and REFRIGERATION

THE NA
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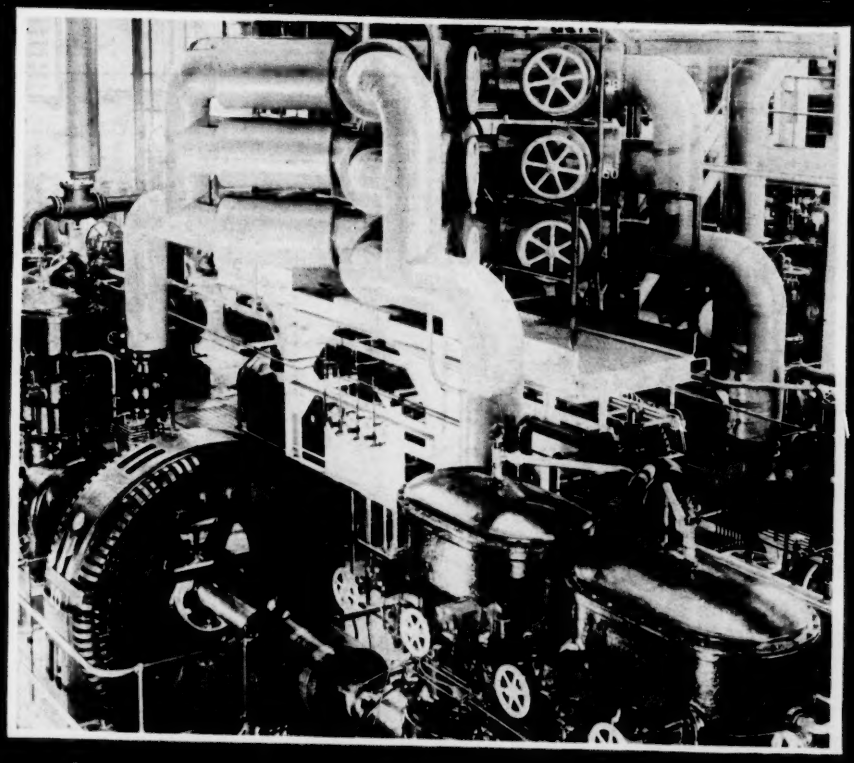

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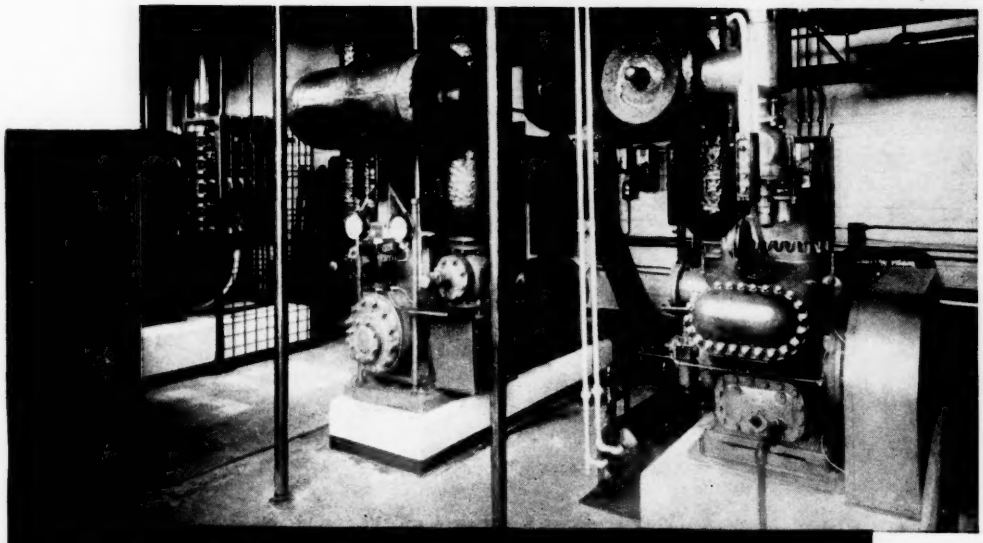
Photo Courtesy York Corporation



ASSURE DEPENDABLE REFRIGERATION

Use the new and improved TEXACO CAPELLA OIL (Waxfree)

For all ordinary refrigeration, the new and improved *Texaco Capella Oil (Waxfree)* provides ideal compressor lubrication — and tests show *no other oil can beat it in ultra-low temperature service!* That's why, with *any* compressor, at *any* temperature down to minus 100°F., you'll get clean, efficient operation . . . enjoy freedom from wax precipitation.

Texaco Capella Oil (Waxfree) has outstandingly low haze and floc temperatures. It's an oil of extreme purity, with an extremely low pour test, high resistance to oxidation and freedom from moisture. It will not react with refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)* . . . and a Texaco Lubrication Engineer will gladly help you select the right one to assure you better compressor performance . . . regardless of the type, size or age of your compressors or the refrigerant used. *Texaco Capella Oils (Waxfree)* are obtainable in *refinery-sealed* containers — 55-gallon drums, and 5-gallon, 1-gallon and 1-quart cans for make-up.

Call in a Texaco Lubrication Engineer today. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Capella Oils (Waxfree)
FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

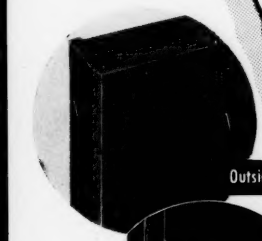
new "X-TYPE" doors

MOST REVOLUTIONARY ADVANCEMENT IN THE COLD STORAGE DOOR INDUSTRY!

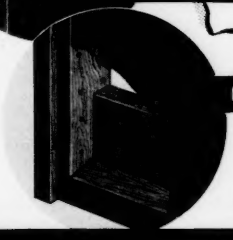
Advantages of "Butcher Boy" NEW "X-TYPE" Construction:

1. "X-Type" Steel Diagonal Bracing is the basic principal of RIGIDITY.
2. Guarantees MAXIMUM INSULATION FILL inside of door.
3. The only POSITIVE method to prevent door sagging.
4. Allows REVERSAL OF DOOR SWING if necessary.

The Strongest and Most Durable Cold Storage Door Built!



Outside Corner Construction



Inside Corner Construction

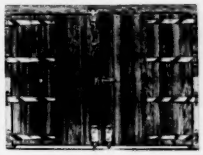
"INTERLOK" NO-SAG CORNER CONSTRUCTION *(Pat. Pend.)*

No other cold storage door company can offer the exclusive features of "X-Type" Steel Bracing and "Interlok" No-Sag door construction . . . Specify these features . . . They cost no more.

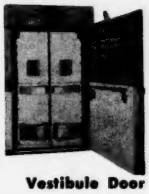
ALL BUTCHER BOY DOORS ARE BUILT "X-TYPE"

Plywood Door

Truck Door



Double Door



Vestibule Door

Low Temp. Door

BUTCHER BOY COLD STORAGE DOOR CO.

170-180 N. SANGAMON ST. ★ CHICAGO 7, ILL. U. S. A.

Write Today for New Catalog

Butcher Boy Cold Storage Door Co.
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Please send me your new catalog on Butcher Boy "X-Type" doors

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Address_____

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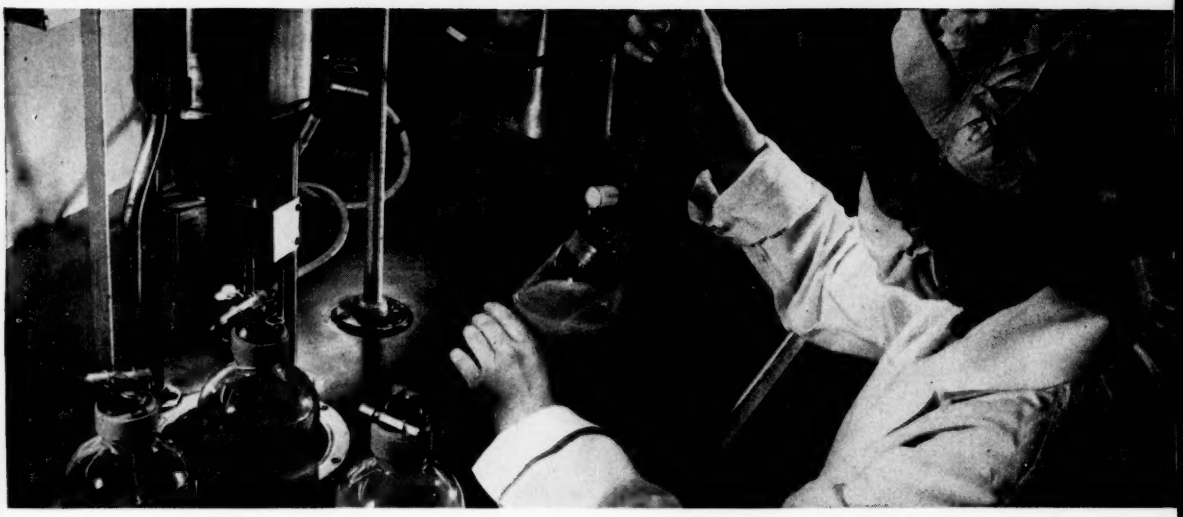
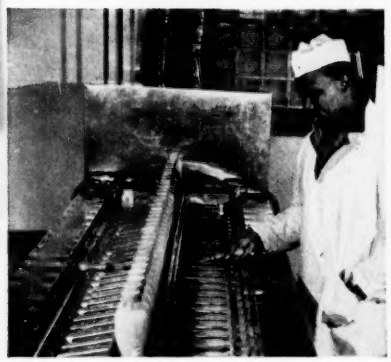


DRAWING OFF PLASMA from centrifuged blood. The plasma, which is in the upper part of the bottle, constitutes about 50 percent of the volume. The room in which this operation takes place is carefully air conditioned to minimize bacterial growth. Suniso Oils assure trouble-free performance of the air-conditioning equipment.

PLASMA PRODUCTION ASSURED BY SUN

Refrigeration—lots of it and never-failing—is vital in processing blood plasma. At Sharp & Dohme, world's largest producer, temperatures must be held at precise levels ranging from 40F in processing rooms to −4F for storage of the frozen plasma. To protect the costly compressors, assure continuous output and minimum organic change in the plasma, this company relies on Suniso Refrigeration Oils. Thanks to Suniso, compressor operation has been trouble-free since the very start of production.

Dependable service like this has helped make Suniso Oils first choice of equipment manufacturers. For free booklet describing all grades of Suniso Refrigeration Oils, write Department IR.11



"SHELLING" MACHINE rotates bottles of plasma in a dry-ice bath held at −94F. Plasma freezes to the bottle walls, leaving hollow cores which speed the special dehydration process. The bottles are then stored for several hours at −4F. This is no challenge to Suniso Oils, the low-temperature grades of which operate satisfactorily below −120F.

DRIED PLASMA, ready for shipment to hospitals and to the Armed Forces overseas, being removed from a dehydration chamber. Here a vacuum equal to an altitude of 40,000 feet removes the liquid portion from the frozen plasma. The finished product contains less than 1 percent of moisture, evidence of the efficiency of the Sun-lubricated high-vacuum pumps.

HIGH VACUUM PUMPS being tested for possible leaks by a technician. Radioactive material in a cylinder connected to the system detects the presence of acetone, which has previously been sprayed over a suspected area. Solnus Oils—"Job Proved" lubricants for this type of pump—have consistently matched the dependability of Suniso Oils in the compressors.

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ICE and Refrigeration

VOLUME 122 NUMBER 2

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February 1952

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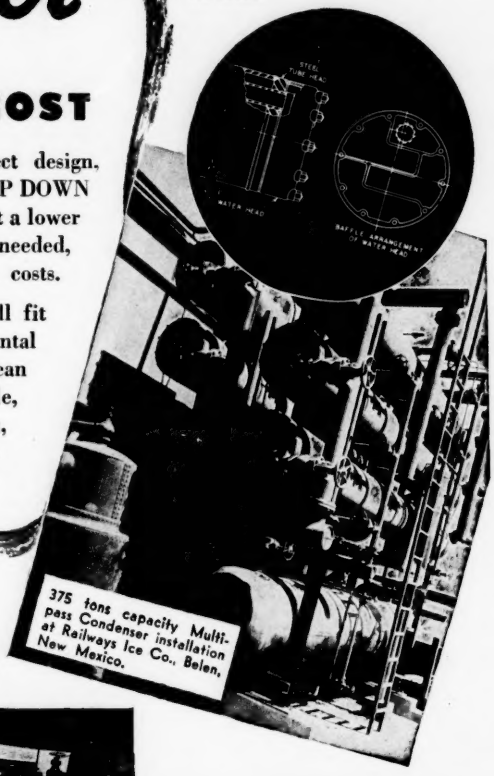
$ave Power and REFRIGERATION COST

Vogt Condensers, because of their correct design, STEP UP the rate of heat transfer and STEP DOWN head pressures. With the liquid delivered at a lower temperature, smaller compressor capacity is needed, saving in original as well as operating costs.

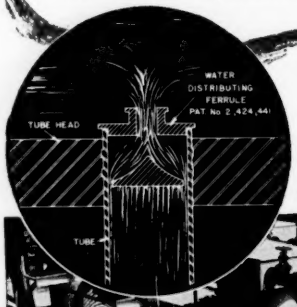
One of the two basic types illustrated will fit your operations exactly. Install Horizontal Multipass (closed type) for use with clean waters. Where the water is hard, forms scale, contains mud or promotes fungus growth, Vertical Single Pass (film type) which can be cleaned in operation, are recommended.

Horizontal Multipass Condensers
(Closed Type)

Water circulated in tubes traverses the length of the unit a number of times as determined by baffles in the heads.

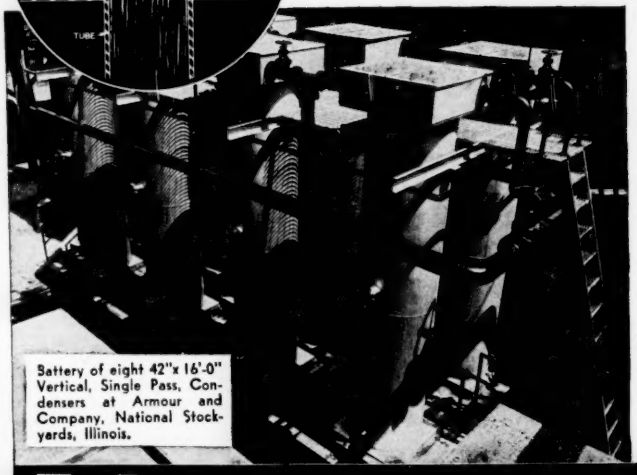


375 tons capacity Multipass Condenser installation at Railways Ice Co., Belen, New Mexico.



Vertical Single Pass Condensers
(Film Type)

Patented ferrules give equal distribution of water to and over the surfaces of all tubes in a unit.



Battery of eight 42"x 16'-0" Vertical, Single Pass, Condensers at Armour and Company, National Stockyards, Illinois.

HORIZONTAL and VERTICAL TYPES SHELL and TUBE CONDENSERS For Every Service

Write For Bulletin RC-1

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INCORPORATED
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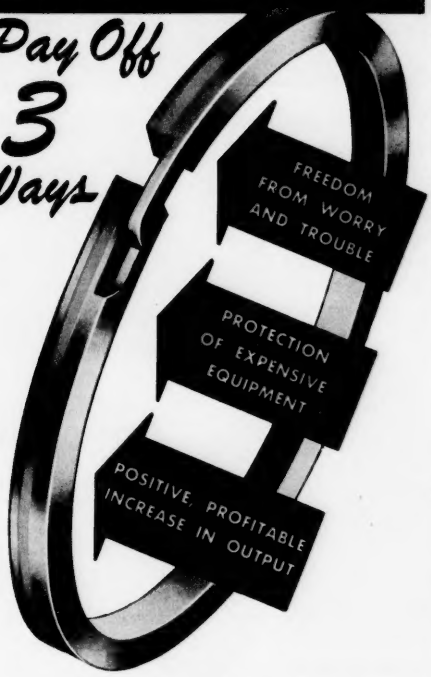
Vogt REFRIGERATION CONDENSERS

SAFETY SEAL PISTON RINGS

Pay Off 3 Ways



OPERATING RECORDS prove that Safety Seal Bronze Band Rings step up volumetric efficiency in ice machines, and refrigerating compressors. The permanently bonded bronze band provides positive protection against scuffing and excessive ring and cylinder wear, and assures you of additional years of worry-free operation.

Unless you are using Safety Seal Rings you are probably getting less than the best performance from your equipment. It will pay you to write TODAY for Catalog R-2, and name of nearest Safety Seal Representative.

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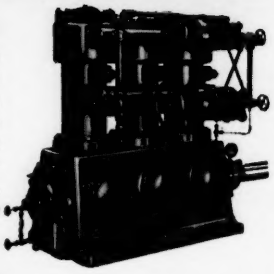
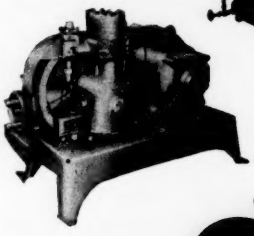
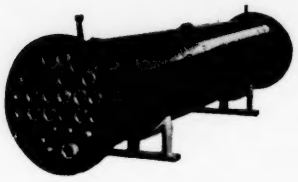
A size and type for every job!

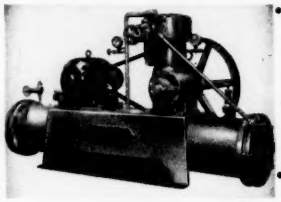




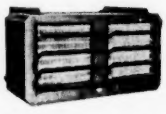
FREON-MYTHYL CONDENSING UNITS

SHELL AND TUBE CONDENSERS AND EVAPORATIVE CONDENSERS





FULL AUTOMATIC AMMONIA COMPACT UNITS



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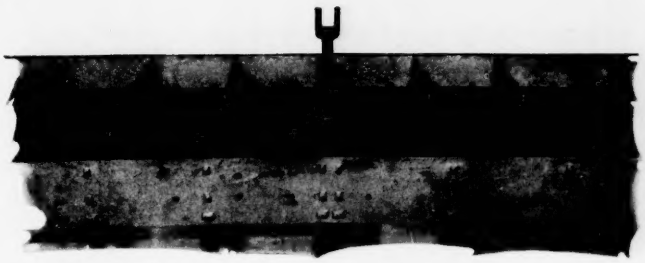

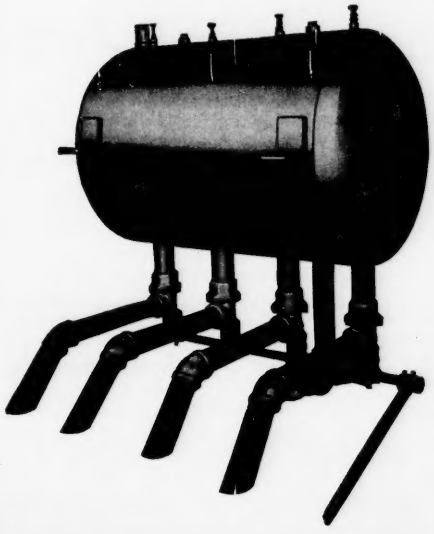

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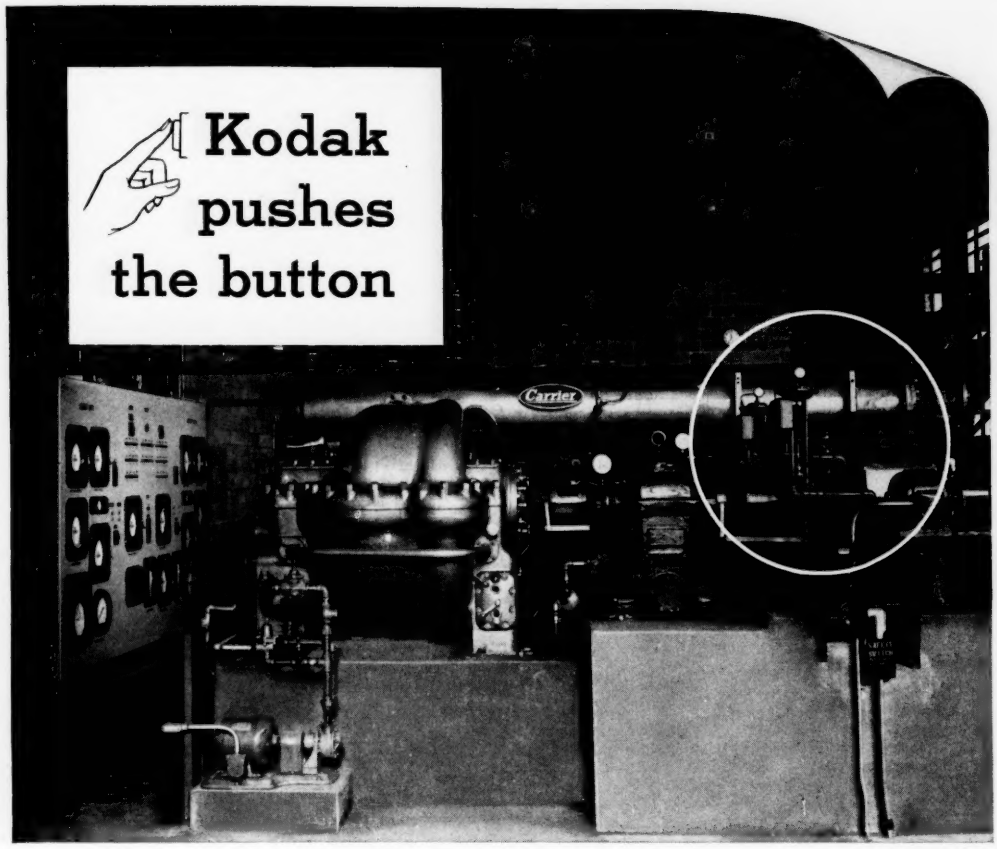

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in controlling the refrigeration system at Kodak's huge new Distribution Center at Rochester, N.Y.

This center handles practically every Rochester-manufactured Kodak product for storage, packing and shipping in its 476,000 square feet of floor space.

Air conditioning for storage of sensitive photographic films and papers is extremely important, and it starts off right with these 250-ton Carrier centrifugal compressors which supply the chilled brine to the Taylor controlled temperature zones . . . "the most fully automatic compressors we ever installed", say Carrier engineers about these Taylor controlled centrifugals.

Taylor controls keep the output temperature of the chilled brine constant by regulating the oil volume in the hydraulic coupler (circled) between the compressor itself and a constant speed motor. During periods of minimum load, an ingenious hot gas by-pass induces a load on the compressors to eliminate surging and keep the system fully automatic. From Friday night to Monday morning, when the load is especially light, the system automatically keeps the brine temperature constant with *no manual attention whatever.*

No matter what your air conditioning or refrigeration problem may be, you'll get most efficient operation from your equipment when it's under Taylor Control. Ask your Taylor Field Engineer, or write for **Catalog 300.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

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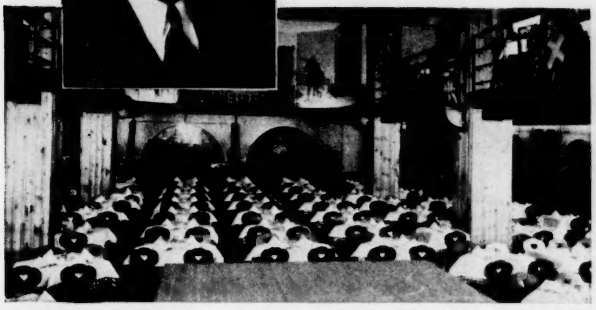
ACCURACY FIRST
IN HOME AND INDUSTRY

"Your Ice Bag is a godsend...keeps ice 100% clean and sanitary"

reports Herman Pirchner of Cleveland's Alpine Village



Alpine Village, in Playhouse Square, is Cleveland's only theatre restaurant. For 15 years it has been known as the smart spot for fine food before and after the theatre.

Let the Union One-Trip Ice Bag Be Your Star Salesman

LIKE HUNDREDS of other leading restaurants, Herman Pirchner's famous Alpine Village buys processed ice from a company using Union Paper Ice Bags.

Let that be a tip to you! Stake a firm claim to the big users of processed ice by demonstrating the superior features of the Union Ice Bag.

Show how the wire tie locks out dirt, bars pilferage and spillage. Show how the double layer of wet-strength Kraft paper retards melting. Explain why icing from a handy paper bag and doing away with re-usable containers cuts labor costs.

Consider your own operation, too! Union Paper Ice Bags speed up handling at ice processor, loading platform, delivery point. You sell more ice at lower cost when you use Union Paper Ice Bags.

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ONE TRIP

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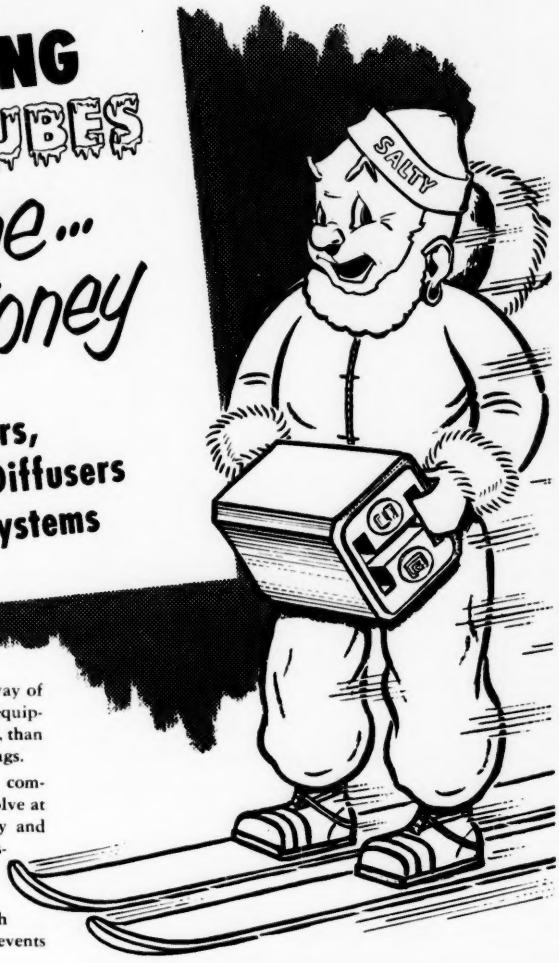

NOW PROFIT by this convenient, dependable way of providing steady operation of refrigerating equipment with less attention, less maintenance effort, than former methods of adding loose salt or salt in bags.

Sterling Kooler Kubes are special heavily compressed 50-lb. refrigeration salt cubes that dissolve at an even rate to strengthen brine continuously and uniformly. They eliminate the labor and guesswork of measuring loose salt.

Kooler Kubes make it possible to maintain brine at the proper *Salometer strength* which substantially reduces product shrinkage and prevents the icing of coils.

Sterling Kooler Kubes save on salt consumption, eliminate the troubles caused by clogging of spray nozzles, and help to eliminate fog in chill rooms.

For better operation with less maintenance, simply place one or more Sterling Kooler Kubes in the pan of each unit cooler or on the spray deck.

Kooler Kubes do the rest . . . slowly dissolving in the recirculating brine for maximum efficiency of the refrigeration equipment. For additional information or technical help, mail coupon at right.

IMPORTANT—For large installations of refrigerating equipment, always investigate the possibility of using the †Lixate Rock Salt Dissolver.

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☐ Please send additional information.

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*Company*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

In The Spotlight

THE DESIGN of reciprocating and centrifugal compressors with relation to their applications in conventional comfort cooling systems, also the problems of selection, especially with respect to comparisons between the centrifugal and reciprocating types, are discussed in the article starting on page 13.

THE ANNUAL Fact Finding Conference of the American Poultry Industry, to be held at Kansas City, February 10-11, will offer new ideas and answers to problems in the industry. See page 18.

BASIC INFORMATION on the relation of the Warehousing and Storage Division, DTA, to the refrigerated warehousing industry is given in an interview by Harold K. Osgood, director of the division. Mr. Osgood gives some revealing information on the industry, as seen by the personnel of this division. See page 20.

CARELESS LOADING of packages into car or trailer from a warehouse results in loss of time, increased handling costs, and might lead to increased storage or truck rates. An experienced warehouse traffic manager writes on this subject, page 22.

EDIBLE PEANUTS to retain top quality in long time storage must be stored under controlled refrigeration and proper humidity conditions, according to a study conducted by the Georgia Experiment Station. A bulletin giving details and results of this study is reviewed in article starting on page 25.

AN INDUSTRIAL refrigeration installation, one of the largest in service, now serves the Celenese Corporation of Amcelle, Maryland, with a total capacity of 1000 tons. For description and pictures of the refrigerating equipment see page 41.

COVER PICTURE: 10,000 tons of refrigeration capacity. Section of one of the refrigerating units in plant of Celanese Corporation at Amcelle, Md. Overhead manifold enables the new machines to operate at any of three suction pressures. See story on page 41.

COLD STORAGE HOLDINGS for December 1951 showed a slight decrease in public cooler space, while freezer space utilization remained the same as the previous month. See page 23.

INSULATION for refrigerated warehouses, how it should be selected and applied, was discussed at the recent convention of the A.S.R.E. by J. V. Grubbs, superintendent of the Cold Storage Department of the Alabama State Docks. See article on page 28.

THE MEAT-ON-ICE program, outlined in the January issue offers a potential annual market for nearly four million tons of crushed ice. Discussion is continued with some practical suggestions as to selling this idea to meat market operators. See page 33.

ICED SWEET CORN from field to consumer has been proven popular with retail buyers, they will pay more for it, and it offers the ice industry an opportunity to increase its ice tonnage in corn growing areas. These points are demonstrated in review of project conducted in Illinois, published on page 37.

HOW THE USER of refrigerating equipment can get the most for his money was discussed at a meeting of the National Association of Practical Refrigerating Engineers by two speakers, a purchasing agent for a packing company, and a manufacturing equipment manufacturer. For copies of their talks see pages 45 and 46.

60 Years Ago

From the February, 1892 issue of ICE AND REFRIGERATION

AN ARTICLE by John E. Starr, prominent refrigerating engineer of those days, airs a difference of opinion between proponents of the compression and absorption refrigerating machines. Each made claims of superiority over the other which the author said was not warranted by the facts. Although leaning toward the absorption system, Mr. Starr says it is not his intention to claim that every absorption machine is as good or better than a compressor, adding that there are plenty of mighty poor absorption machines and of compressors also.

The Status of watermelons, whether a fruit or a vegetable was established in a decison by the United States government. A carload of melons was shipped from Mexico to this country. By import laws, fruits were admitted free and vegetables were taxed 20 percent ad valorem. The customs decided they were vegetables and imposed the tax. The shippers appealed and the government advisory board at New York held that they were fruit.

TWO CLEVER young men at Pittsburgh put a plea in the ears of egg buyers in that city and a pot of money in their own pockets by a shrewd use of refrigeration which is easy enough in many places but does not seem to have occurred to Pittsburghers generally. Last June they began to buy eggs in the surrounding country and placed them in cold storage warehouses. And now (late January) they brought them out, not fast enough to glut the market. They stored about 230,000 dozen at an average price of 12 cents and were unloading at 25 and 30 cents.

ICE HOUSES for farms and creameries were built without packing of sawdust, charcoal or other substances, merely by leaving dead air spaces, and were considered very good for the purpose. However, this is qualified by the assertion that a combination of the two systems is by far the best.

A CONTRIBUTOR writes to propose a new phase of the usefulness of cold storage in keeping young nursery trees in a controlled temperature for a time prior to planting out in the open ground, or until it has fairly warmed up. This cold storage, it is explained, effectually guards the young trees against premature growth.

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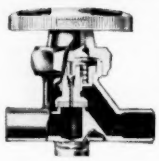
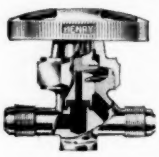
They give more dependable service because of advanced field-proven design and construction as well as patented features.

PACKLESS VALVES FOR FREON with Exclusive Balanced-Action



STANDARD TYPE

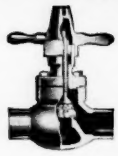
Ball check in balancing channel permits diaphragm inspection and replacement with valves under line pressure. Sizes, ¼" thru ⅝" flare; ¼" thru 1⅜" O.D. Solder, ¼" thru 1" F.P.T.



BLUE BANTAM TYPE

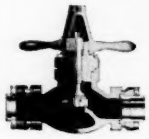
Same as standard Balanced-Action valve except that diaphragms cannot be inspected or replaced under line pressure. Size ¼" thru ⅝" flare and O.D. Solder.

PACKED VALVES FOR FREON Bronze-Wing Cap Type



Globe and angle types with solder connections, bolted bonnets, sizes ⅞" thru 5⅛" O.D.

SEMI-STEEL WING CAP TYPE



With bolted bonnets and square companion flanges. Furnished with brass tailpieces (O.D. Solder) 1⅜" thru 5⅛" or with steel tailpieces for welding to pipe, sizes 1¼" thru 5".

Also Globe and angle types with F.P.T. connections, sizes ½" thru 2".

PACKED VALVES FOR AMMONIA Permanent-Mold Iron and Semi-Steel

Compact and strong with self-aligning stem disc. Sizes (F.P.T.), screw bonnet: ¼" thru 1", bolted bonnet 1¼" thru 2"—with flange connections 1¼" thru 5".

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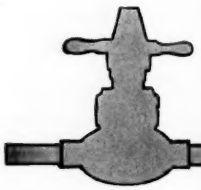

Valves—Driers—Strainers—Control Devices and Accessories for Refrigeration, Air Conditioning and Industrial Applications

MELROSE PARK, ILL. (CHICAGO SUBURB)
CABLE: HEVALCO, MELROSE PARK, ILLINOIS
®

MODERN REFRIGERATING MACHINE

Models introduced to public since end of World War II for air conditioning applications employ refinements of design, use new materials and production techniques.

GERALD E. HICKE,
Manager Transportation Sales Dept.
The Trane Company LaCrosse, Wisc.

MANY new types and models of refrigeration compressors have been introduced to the public since the end of World War II. These new machines employ refinements of design, use new materials and are built with new manufacturing techniques —all of which give longer life, less maintenance and allow wider applications than prewar designs.

In this article we will take up the design of reciprocating (Fig. 1) and centrifugal compressors (Fig. 2) with relation to their applications in conventional comfort cooling systems. It will also take up design trends in new models; and the influence of varied comfort cooling, refrigeration systems for freight cars—trucks—ships—and all types of portable systems including crane cabs.

In improving and broadening the application of modern refrigeration compressors, we may use the aircraft engine as an analogy. It became evident early in World War II that piston type engines had reached a practical limit with respect to size and horsepower. Yet higher aircraft speeds had to be obtained to meet military needs. The answer was the jet engine and its various modifications, employing rotating wheels in one manner or another, rather than a piston in a reciprocating engine.

While it is dangerous to oversimplify this analogy, it can be stated that the refrigeration industry faced the same fundamental problems as the aircraft people. When mechanical refrigeration became a reality the low speed of prime movers, the limited knowledge of thermodynamics and the narrow selection of materials and refrigerants dictated the use of slow speed reciprocating machines. As the industry grew, these machines increased in size and moderately increased in speeds—and a quarter of a century ago it was thought that they would always dominate the market.

Progress in high rotative speed machinery such as the turbine created the opportunity for higher speed refrigeration machines—and development of the centrifugal compressor was inevitable. It is significant that these new machines like the jet engine also employ rotating wheels.

Early applications of centrifugal compressors in the field of mechanical refrigeration soon made it obvious that this machine afforded savings in material and space. Further development, particularly in larger sizes, proved that the efficiency and cost were comparable or superior to the reciprocating machine.

Since both types of machines are now being manufactured and installed, the problem at once arises as to which compressor should be used for a particular application. For the present, it can be said that the reciprocating compressor dominates the field of 50-ton capacity and less.

On the other hand, the centrifugal compressors are particularly applicable to loads of 100 tons and larger. The range between 50 and 100 tons may be considered to be a twilight region, where all factors of design, space and economics must be considered to make the proper selection from the standpoint of reliability and first costs and operating expense. I would like to discuss these factors in the following paragraph.

Where the condensing and evaporating temperatures are held to small variations, as in comfort air conditioning, the centrifugal compressor is well adapted. Where there is a wide variation in these temperatures, the

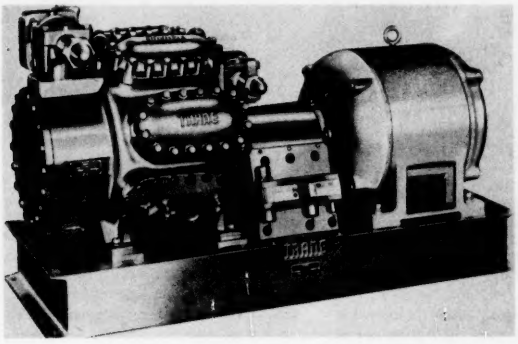

Fig. 1—Multiple row compressor with direct connected motor.

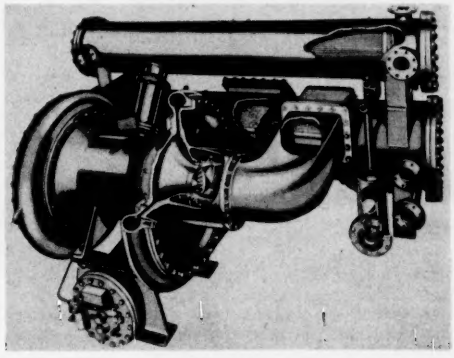

Fig. 2—Centrifugal compressor unit with cut away showing inlet vane control of capacity.

or unusual applications, such as transportation air conditioning and refrigeration in relation to compressor selection and service. In addition, the article will discuss the interesting problems of selection, especially with respect to comparisons between centrifugal and reciprocating compressors.

While comfort cooling and normal refrigeration applications are the major markets for these machines, the volume production required to obtain the lowest possible manufacturing costs demands that these units be applied as broadly as possible. This means that the basic model with slight modifications must be used for wide applications as railroad and bus

Presented to the 42nd Annual Convention, NAPRE.

reciprocating compressor will best serve the purpose.

The centrifugal compressor, with inlet vane control (Fig. 2) is able to modulate the capacity from less than 10 per cent up to maximum load. On the other hand, the reciprocating compressor, with cylinder unloaders, is able to control the capacity in separate steps (Fig. 3) as an example—25-50-75 per cent and full load.

From the standpoint of the starting load, the centrifugal always starts at zero load. The reciprocating compressor will usually always start with some load, as we will explain later. Modern design has greatly increased the smoothness and quietness of the reciprocating compressor but for comparable capacity, it cannot compete on this with a centrifugal compressor.

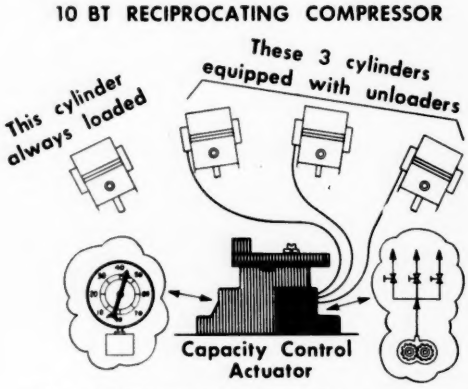
10 BT RECIPROCATING COMPRESSOR
These 3 cylinders equipped with unloaders
This cylinder always loaded
Capacity Control Actuator

Fig. 3—Three-step cylinder unloading method.

A centrifugal compressor requires a purge pump. In normal air conditioning applications, the compressor is operated below atmospheric pressures and any leaks are into the system. A purge pump is used to maintain a low level of non-condensable gases in the machine. Of course, a purge pump is not required with a reciprocating compressor, because a system employing a reciprocating compressor using Freon 12 or 22 is operated above atmospheric pressure.

Service Needs Negligible

The service and maintenance needs of a centrifugal, particularly of the hermetic design, are negligible because the machine has only one major moving part with two bearings, affording a simple lubricating system. The reciprocating compressor has a multiplicity of moving parts, all tending to increase the problem of service and maintenance.

Because of the simplicity of centrifugal refrigeration compressor design, we may expect that its applications will continue to expand as further development continues. With new developments, it can be expected that larger sizes of reciprocating compressors will decrease in use. However, much work remains to be done before centrifugal machines smaller than the 50 horsepower are available. The maximum speed of centrifugal compressors, at 3600 rpm with 60 cycle current and with acceptable refrigerants, is one of the present bottlenecks in this compressor design, without sacrificing simplicity and quiet operation through the use of gears to increase impeller speeds.

With regard to speed, there have been definite trends toward increasing the speed of reciprocating machines — even the belt-driven types. The modern up-to-date machine is direct connected and runs at full load motor speed, giving small and compact design and eliminating the V-belt drives. With a compressor designed for these higher speeds, there is no sacrifice of efficiency or life. These designs must not only be concerned with proper materials and precision manufacture of all parts but also with improved valve and port designs to allow efficient handling of the gas at high velocities. Therefore, we cannot consider simply speeding up an existing machine to provide the answer to higher speed and increased capacity.

Now let's take a look at the applications of reciprocating compressors to some unusual cooling systems.

A reciprocating compressor for a comfort cooling system is a relatively simple, straightforward job. Based on standard conditions of 40 degrees suction and 105 degrees condensing temperatures, the compression ratio is 2.7 to 1. However, to use the compressor at minus 20 degrees suction temperature for a frozen food storage plant, and 105 degree condensing temperature, the ratio is now 9.2 to 1. Therefore, the range of operating conditions for the standard machine is subject to wide variations.

Values

Experience has shown that standard valves for air conditioning give good results up to 7.5 to 1 ratio. Beyond this range a minor change in construction will increase the capacity materially over standard valves. As an example, the capacity is increased as much as 20 per cent at 10 to 1 ratio.

The wide variations obtainable with these relatively minor design changes make the reciprocating compressor applicable to many types of refrigeration systems. Systems are sometimes designed to include a compressor that will perform over suction temperatures from minus 20 degrees to plus 40 degrees, and condensing temperatures varying from 60 to 140 degrees. Truck and railroad refrigeration systems are examples of this type of service.

Investigation into this field has shown that refrigeration systems are entirely practical which are designed to pre-cool loads of fruits and vegetables and to hold the temperature to a range of 32 to 65 degrees as selected. These systems are also practical for handling frozen foods at minus 10 degrees to minus 15 degrees without any change in the system. You might well imagine that the compressor, condenser, evaporator, refrigeration and temperature control systems must be very carefully engineered to give the results needed.

Marine Work

In designing reciprocating compressors and building into them the needed flexibility for this variety of application, the marine transportation field must also be considered. Shipboard installations require satisfactory performance when vessels roll and pitch or are in a permanent inclination. The most difficult specification requires the compressor to be rolled from side to side up to 45 degrees (Fig. 4) and to be pitched 15 degrees 'fore and aft.' With a slight change in our own compressors, we have tested them in permanent positions up to 50 degrees without effect on their performance. We don't recommend that you try it on a conventional compressor, however.

One of the real improvements in modern compressors is cylinder unloading for capacity control. A compressor for the usual air conditioning

installation permits partial unloaded starting and automatically operates to control capacity. As previously outlined, unloaders on the usual compressor installation are installed to provide separate steps of capacity—as an example—25-50-75 per cent and full load. (See Fig. 3.) It shall be noticed that unloaders are unnecessary on the first step of unloading from a capacity control standpoint. Further, the omission of the unloader in this cylinder will assure cooling by the suction gas to remove the frictional heat of the operating compressor. Therefore, possible damage to the compressor is avoided if unloaders or their control should fail to operate properly. Unless unloaders are installed on all cylinders, fully

driven by engines as in railway, ous and truck applications, the problem of starting is considerably different than stationary installations, where we may consider that an unlimited amount of power or energy is available to start the compressor. The torque capacity of an engine and the stored energy in its fly-wheel must be used to start the compressor. The time interval between dead stop and operation at top speed must be given consideration to prevent stalling the engine. Here, complete unloaded starting is valuable in order to allow top compressor speed before imposing the load of compression. Therefore, unloaders on all cylinders or a bypass between suction and discharge may be desirable.

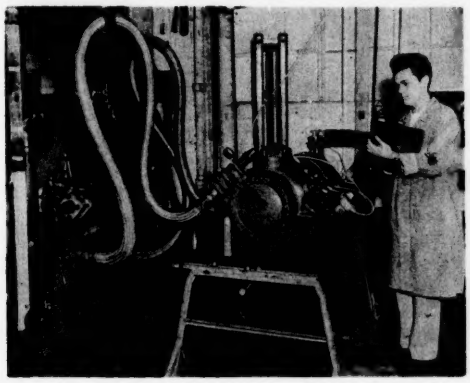

Fig. 4—Test operation of a compressor with 45 degree roll to simulate conditions at sea.

unloaded starting will not be obtained and the motor used must have sufficient starting torque to pull the unloaded piston over its first revolution. The modern multiple cylinder compressor permits the use of normal torque motors at a price saving as compared to high torque motors commonly used on older machines with fewer cylinders.

Where, however, the compressor is

Unloaders used for capacity control present equally important problems. The average air conditioning system employs unloaders controlled by suction pressure. If, however, the suction pressure to the compressors does not change with the load change, the unloaders will only operate when the system is pumped-down and stopped by the low-pressure switch.

To explain this problem of unloading requires that we analyze several types of refrigeration systems. First, let's take a look at one of the simplest refrigeration systems (Fig. 5, left)—that of single cooling coil and compressor, with a thermostat located in the re-circulating air stream, to start and stop the machine. The thermostat in this case is set for 78 degrees. It will function to start the compressor at roughly 79 degrees and cool until the air temperature reaches 77 degrees, maintaining an average temperature of 78 degrees. Therefore, the amount of heat passing over the evaporator between 77 and 79 degrees is essentially constant and will change only because of a change of heat in the outside air, used for ventilation. Usually, the load variations in outside air are small as compared to the overall load. And as a result, in our simple system, the load is quite constant and the suction pressure also remains constant — the unloaders may not operate.

Split Coil

Therefore, the evaporator must be controlled with load changes to reflect a change in the suction pressure to the compressor, permitting the unloaders to function. This situation can be accomplished by splitting the evaporator coil into sections (Fig. 5, center) which approximate the number of steps of cylinder unloaders and each section of the coil controlled by separate thermostat which is typical of railway comfort cooling systems. Then, as part of the coil is shut off, suction pressure will drop and an unloader unload. As an alternate, a suction pressure regulator can be used which will raise or lower the coil temperature demanded by the thermostat — again the suction pressure between the regulator and machine will change, allowing the unloaders to function.

With multiple evaporator units (Fig. 5, right) each under separate thermostat control, working with a single compressor, the unloaders will

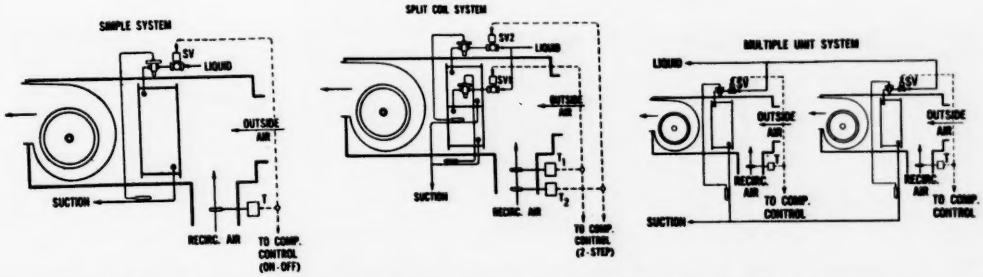

Fig. 5—Several types of refrigeration systems to illustrate methods of step unloading of compressors.

function the same as splitting a single coil and the unloaders will serve a real purpose.

It is well to consider that capacity control in a compressor, no matter how obtained, is a separate problem from temperature and humidity control. However, to best serve the particular conditions under which the compressor must operate, the controller for the unloaders is made externally adjustable. Also, if it is advantageous, suction pressure control can be eliminated and unloaders directly controlled by electric or pneumatic devices in response to thermostat demand (Fig. 6).

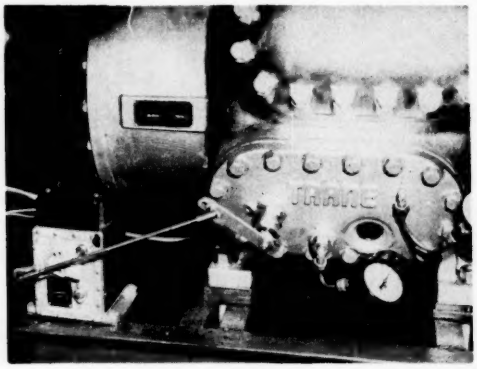

Fig. 6—Method of applying an electric or pneumatic drive to unload the compressor.

Now, let's take a look at refrigerants used in modern reciprocating compressors. Freon 12 has generally been accepted for all normal work because of favorable experience and wide use. The Freons are safe as compared to ammonia and will allow the use of copper in the compressor, the piping and in the balance of the system; while ammonia is usually confined to steel or aluminum materials.

Where comfort cooling is the only consideration, it must be remembered that ammonia is not acceptable while the Freons have been approved by the insurance underwriters.

One of the newer Freons, Freon 22, presents some interesting problems in compressor design and use. For example, a machine built for Freon 12 will have roughly 55 per cent more capacity when used with Freon 22, and operated at the same speed and temperature as with Freon 12. This means that 55 per cent more horsepower must be applied to the shaft and running gear.

In addition, seal assemblies of open models must be designed for high crankcase pressures, when Freon 22 is used, or these models must be relatively unaffected by the high pressures. Obviously, any conversion of existing compressors to Freon 22 in order to increase their capacity is dangerous, even if we discount the fact that larger motors, evaporators and condensers are also required with the refrigerant change.

Freon 22 is becoming increasingly popular for small air conditioning units where the smallest and compact designs of compressors are essential. Also, it shows marked advantages over Freon 12 for the very low temperature systems.

We have considered in the above paragraph certain features of compressor design required when Freon 22 is used. Of prime importance, as mentioned, is the need for high speed and directly connected compressors. We should also like to highlight additional features of compressor design and construction that are considered equally important.

Nodular Cast Iron

Crankshaft life in modern compressors has been increased by the use of nodular cast iron. Nodular cast (Fig. 7) iron is cast iron with a small per cent of magnesium added, causing carbon to form in nodules or round particles rather than in flakes. Because of the new structure of the carbon, fracture surfaces are eliminated. It is, therefore, possible to obtain the wear characteristics of cast iron with strength equal to or exceeding forgings.

While it is a relatively simple matter to employ nodular iron for the balance of castings needed in the machine, it is not considered essential. This is because close grained cast iron is satisfactory for body parts. However, with expanding use of nodular iron, it undoubtedly may be possible to reduce the thickness of the cast sections and save weight without loss of strength. This new cast iron can also be used where added strength is essential—as to meet shock requirements of railway freight and Navy installations.

Another improvement in compressor design is in surface processing the suction and discharge valves. The increased life of processed valves is quite startling, as their life has been increased as much as ten times over the usual ground or lapped types.

In modern compressor design a larger suction chamber is used (Fig. 8) to permit separation of all solid particles from the gas stream before they damage the compressor. Large suction strainers and oil filters are installed in this chamber to make sure that dirt particles will be separated from the gas stream and that the gas and oil will be thoroughly filtered. A positive-displacement, reversible oil pump in the lubricating system is es-

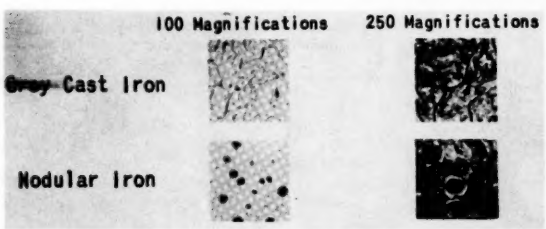

Fig. 7—Granular structure of grey and nodular cast iron are compared.

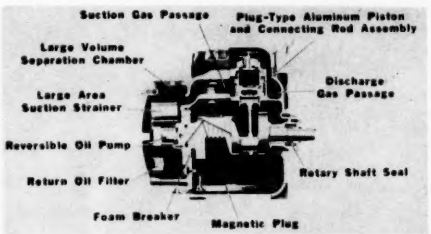

Fig. 8—Cut away section of compressor shows features of construction.

sential, because it permits operation in either direction, eliminating danger to the compressor from improper wiring and reversed rotation. In modern compressor design, magnetic plugs should be installed in the crankshaft to hold any small magnetic particles passing through the oil system to keep them from the bearing surfaces. The oil holes from the main lubricating passage in the crankshaft to the bearings should be toward the center of rotation in order to take advantage of the centrifugal effect of the shaft rotation to remove dirt particles.

Oil Loss

The loss of oil in a compressor can occur after a machine has been idle for an extended period. This is caused by the Freon being absorbed in the oil and by the condensation of refrigerant in the crankcase when the compressor is cooler than the condenser or receiver. Then, on start-up, the pressure over the oil is reduced and the Freon in the oil will foam, similarly to the way the bottle of warm beverage will foam on the removal of the cap. On many compressors this foam will fill the crankcase and will be drawn into the suction chamber, and on out through the cylinders and discharged to the refrigeration system. If this happens the oil charge is lost and there is a possibility that adequate lubrication of the bearings will be hampered by this loss of oil. This may cause the compressor to shut down if equipped with an oil pressure differential switch or damage the bearings when the switch is not included.

To solve this problem of compressor damage through loss of oil, modern compressors have a foam-breaker installed between the crankcase chamber and the suction chamber. This foam-breaker is a very fine mesh screen which breaks up the foam bubbles and permits the oil to drain back to the crankcase, and allows Freon only to be drawn into the suction chamber.

Maintenance

A few statements about maintenance and repair of compressors are in order at this point.

It is well recognized that the day of a mechanic making a new part for a compressor has long since passed. The precision required to make these parts is beyond the ability of the machine or machinist in the average shop. Therefore, all parts that are subject to wear and replacement are available as complete sub-assemblies. It is hoped that in making the replacement the parts are not abused. In other words, the pinch bar, drift pin and machine hammer are certainly not to be considered desirable tools.

In this article we have outlined the considerations of machine design and application from a manufacturer's view point. We emphasized that the building of modern reciprocating and centrifugal compressors depends on constant research for improved performance and use of new materials. We have also covered many details of design that have resulted in improved reciprocating compressor performance. These modern compressors will receive wider application in air conditioning installations and may be expected to make real inroads into the conventional refrigeration markets.

Ice Cream Production

NOVEMBER ice cream production in the United States, estimated at 34,065,000 gallons, was 5 percent smaller than the November output last year and was 8 percent below the 1945-49 average for the month, the Bureau of Agricultural Economics reports. Ice cream production declined 24 percent between October and November this year, compared with a seasonal decrease of 17 per cent at this time last year, and a drop of 19 percent between these months in the 5-year period, 1945-49. In the first eleven months of 1951, ice cream production was up 2 percent from the same period of 1950 but was down 3 percent from the 1945-49 average for these months.

November started with severe cold weather over the entire country, with freezes extending almost to the Gulf of Mexico. By mid-month, temperatures became more nearly normal and in the last week were well above normal generally. For the month as a whole, average temperatures were below normal in most of the northern part of the country, except in the Dakotas and the Pacific Northwest, but above normal in the Southwest and near normal in the Southeast.

Compared with November last year, ice cream production was smaller in all regions of the country except the West, where it increased 5 percent in the Mountain States and 3 percent in the Pacific. Output was off 8 percent in the North Atlantic Region and 6 percent in the South Central. All remaining regions—East North Central, West North Central, and South Atlantic—had a decreased production of 5 percent.

Tests Show Metal Fins Improve Refrigerator Cars

A SUCCESSFUL transcontinental road test was recently completed on railway refrigerator cars modified by the Canadian Pacific Railway according to a new design developed by the National Research Council. Lower carrying temperatures were obtained for food transport.

This full-scale test marked another step in the program to improve railway refrigerator cars, undertaken jointly by the Canadian National Railways, the C.P.R., the Fisheries Research Board and the National Research Council. Three carloads of frozen fish were hauled from Vancouver to Toronto and Montreal, climaxing a long series of N.R.C. model car tests which showed that changes in bunker design could lower car temperatures by as much as 5 F.

The three refrigerator cars used were of the most recent type being built by the Canadian Pacific Railway and, apart from their bunker system, were identical. One test car differed from the standard car only in having metal fins, two inches deep and two inches apart, on the bottoms of the bunkers. A more fully modified car also had finned bunkers, but the bunkers themselves were of a different size and shape and were placed in a different position.

The modified bunker system would add comparatively little to the capital cost of a refrigerator car. The new system, being more efficient, costs less to operate at a given temperature in the normal range—but naturally would cost slightly more to operate at lower than normal temperatures.

The measurements showed that, once the temperatures levelled off, the standard car carried its load at 14.8F., the car with fins alone at 12.1 F and the fully modified car at 9.7 F. Hence the fins alone made an improvement of 2.7 F and the full modification made an improvement of 5.1 F—just about what the model tests had predicted.

British Food Conference

THE British Ministry of Food announces that a conference will be held in London soon between official representatives of the United Kingdom, United States and the Canadian governments on some of the food aspects of the defense. The main purpose of the conference will be to examine, in the light of the experience of the United Kingdom in World War II, the problems which may arise in maintaining food supplies.

Fact Finding Conference Will Offer New Ideas and Answers to Problems

POULTRY and egg people attending the Institute of American Poultry Industries' Fact Finding Conference and Exhibit in Kansas City February 10, 11 and 12 will learn a lot of things that will help them have a successful year in 1952. And they'll pick up new ideas they can use profitably in long-range planning too, according to Cliff D. Carpenter, Institute president. Conference registration and exhibits open in the Municipal Auditorium at 10 o'clock Sunday morning, February 10.

At 1:30 Sunday afternoon the program opens with an Industry-Government Clinic. Clinic chairman Edward W. Priebe, Jr., of Priebe and Sons, Inc., will lead off with an analysis of the job the poultry and egg industry faces at Washington.

Government Clinic

A panel, "Congress Meets the Poultry Press," is next on the schedule, with Representative Harold D. Cooley, chairman of the House Agriculture Committee, answering questions about Congressional policies on poultry and eggs—asked by Mary Clarke, U. S. Egg and Poultry Magazine; Harold Florea, Poultry Tribune S. K. Urner, American Egg & Poultry Review; R. V. Whiting, The Produce Packer; and Phil Evans, Radio Station KMBC. Cliff Carpenter will act as moderator for the interview.

Other speakers on the Industry-Government Clinic include Clif C. Warren of the PMA Poultry Branch, Colonel C. F. Kearney of the Quartermaster Market Center, George L. Mehrens and George B. Rogers from OPS, and Joseph O. Parker, Pace and Parker, legal counsel for the Institute. These five will present the possibilities and probabilities for 1952 production and supplies . . . the Armed Services poultry and egg shopping list for 1952 . . . OPS plans for chicken, turkey and egg ceilings . . . and activities of the five Washington agencies that affect poultry and egg operations the most.

Sunday evening the Institute will hold its annual Open House, where the fact-finders will have a chance to catch up on their visiting and take time out for a refreshing snack.

Egg Clinic

Monday morning, February 11, W. F. Leimert, Tranin Egg Products Co., will chairman the Shell Egg and Egg Products Clinic. In the first presentation, Adrian J. Vander Voort, head of the Dunwoody Baking School, will stage a baking demonstration to illustrate how important it is for bakeries to have egg products that are uniform in performance.

Four more presentations scheduled for this clinic will show how 4-H Club groups can help promote quality egg production and merchandising . . . what sold hundreds of West Coast producers on marketing *clean, unwashed* eggs . . . what state laws can and can't do to help egg quality programs grow . . . how to get the best results when you're churning frozen eggs. These presentations will be made by Harriette E. Cushman, Montana State College, and Elaine Stirland, 4-H Club member, Chinook, Montana; L. N. Thompson, Poultry Producers of Central California; Ralph S. Yohe, Prairie Farmer; R. H. Forsythe, Armour and Company.

Production Clinic

Monday afternoon D. D. Moyer, Ohio State University, will chairman the Production Clinic. The eleven speakers taking part in this Clinic are: G. E. Coleman, Jr., Nichols Poultry Farm; Charles Vantress, Vantress Poultry Breeding Farm, Inc.; Dr. T. C. Byerly, U. S. Department of Agriculture; Dr. A. W. Brant, U. S. Department of Agriculture; Dr. E. E. Schnetzler, DeKalb Agricultural Association; Dr. W. J. Stadelman, Washington State College; Robert E. Loomis, Loomis Hatchery; C. A. Miller, Armour and Company; Clif F. Parrish, North Carolina State College; Robert L. Hogue, Purdue University; and Dr. Mark F. Welsh, Lederle Laboratories.

In five presentations, these speakers will come up with the answers to such questions as: 1 what can breeders and feed manufacturers do to help supply consumers with broilers that have more meat, better flavor and less bone; 2 how far can breeders go in building higher quality and better keepability into shell eggs; 3 what do growers and retailers think of small turkeys; 4 what type of broiler house and what kind of equipment does the best job; 5 how can you avoid trouble in your Newcastle control program.

Monday evening, two features of the Conference banquet will be the turkey broilers, custom grown and processed especially for this event by Altura Rex Turkeys, Inc., and a parade honoring the 10 top states in poultry and egg income in 1951. The banquet birds will be prepared by the Muehlebach Hotel, in line with special cooking instructions furnished by Kathryn Niles, Home Economist Director for the Poultry and Egg National Board.

Plant Operating Clinic

The Plant Operating Clinic Tuesday morning, chairmanned by Alec Dale, Wilson and Company, will include six presentations by the following speakers: Edward W. Priebe, Jr., Priebe and Sons, Inc., E. L. Lowery, White Oak Acres; Jack R. Miller, tax attorney; T. W. Heitz, Rockingham Poultry Marketing Coop., Inc.; Dr. James H. Steele, U. S. Public Health Service; Dr. C. H. Koonz, Swift and Company; J. M. Moore, Michigan Broilers, Inc.; M. I. Darrow, Swift and Company. During this three-hour session, these speakers will show how and why different operations had different costs in 1951 . . . how tax costs can be held down . . . whether it pays to salvage and process by-products . . . what steps Public Health officials plan to take to clean up unsanitary establishments . . . how a processor, hatcheryman and feed dealer teamed up to provide a better market for producers and a better product for consumers . . . and what results you can expect if you use a scald temperature of 140 F.

Merchandising Clinic To Close Conference

A powerful wind-up for the Conference program is promised Tuesday afternoon, at the Merchandising Clinic. With Theron Brown, of J. D. Jewell, Inc., at the helm as chairman, three presentations by five speakers will cover the fundamentals of good merchandising . . . why more and more eggs are being cartoned at the processing plant . . . and what one large food chain did to triple their poultry business in five years. The Merchandising Clinic speakers include: S. R. Bernstein of Advertising Age; Walter B. C. Washburn of Young and Rubicam; E. Gardner Cole of Swift and Company; C. Howard King, Wisconsin Department of Agriculture; and Paul J. Flinn, The Kroger Company.

Advance hotel reservations were reported running about 20 percent of a year earlier, so the Institute expects a record turnout for the Conference.

Division of American
Warehousemen's Association

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THIS MONTH IN BRIEF

Basic information on government controls and regulations as they relate to refrigerated warehousing is given in an interview of Harold K. Osgood, director of Warehousing and Storage, DTA.

Traffic manager of a Chicago refrigerated warehouse points out that careless loading of trucks or refrigerator cars results in increased handling costs and lost time.

Insulation for refrigerated warehouse construction, to meet ordinary and special needs calls for an understanding of what is needed and the insulation material that will best supply the need.

Public cooler space during December decreased to 64 percent, while freezer space utilization was 83 percent, the same as the previous month.

A study on storage of edible peanuts conducted by Georgia Experiment Station shows that they must be stored under controlled temperature and humidity conditions to retain top quality.

The Government and The Warehousing Industry

THE following interview of Harold K. Osgood, director of warehousing and storage, Defense Transportation Administration, was published by the National Association of Refrigerated Warehouses as the second of a series of question and answer sessions with government officials who are connected with public refrigerated warehousing.

Harold K. Osgood who is interviewed in this article has been in government service since 1939. Serving successively as Chief of the Storage Section, United States Department of Agriculture; assistant director of the Storage Division, ODT; director of Warehousing and Traffic Division, War Assets Administration, Mr. Osgood brings a thorough and sympathetic understanding of the warehousemen's problems to his present important job.

Harold K. Osgood

Question: What is the basic authority under which DTA operates?

MR. OSGOOD: By executive order 10161, the President, among other things, conferred upon the commissioner of the Interstate Commerce Commission who is responsible for the supervision of the Bureau of Service of the Commission, certain functions vested in the President with respect to domestic transportation, storage and port facilities excluding pipe lines, air transport, coastwise, intercoastal and overseas shipping. By organization order DTA 1 of October 4, 1950, the commissioner referred to above established the Defense Transport Administration to exercise the functions conferred upon him by executive order 10161.

Question: What is the stated purpose of the Warehousing and Storage Division of DTA?

MR. OSGOOD: The purpose of the Warehousing and Storage Division, DTA is to assure the adequacy of the nationwide storage system to meet the requirements of the present emergency through coordination of the storage activities of the several government agencies, consideration of essential civilian requirements, assistance in the development of programs to increase storage capacity as and where needed and allocation of facilities when necessary.

Question: Will you describe the program of the Warehousing and Storage Division as it pertains to the refrigerated warehousing industry?

MR. OSGOOD: It's our opinion that the existing refrigerated facilities are sufficient to meet the requirements of the present emergency with respect to cooler space but insufficient with respect to freezer capacity. It, therefore, appears necessary to provide additional freezer capacity in areas of critical shortage and this will be accomplished to the greatest extent possible by encouraging the industry to enlarge its capacity. This may be done either by converting cooler space to freezer space; increasing the capacity of freezer space by adding sharp freezer facilities; or by construction of new facilities.

DTA is making every effort to obtain sufficient controlled materials for the necessary expansion by the industry of freezer capacity. Meanwhile, a further study is being made

to determine, as nearly as possible, what additional freezer space is required to meet anticipated future demands with adequate provision for sufficient standby space to meet a more serious emergency. The results of this study will indicate the definite goals that should be reached in order to accommodate the requirements of the defense program during the present emergency.

Question: What is your opinion of the overall space situation in the refrigerated warehousing industry?

MR. OSGOOD: As indicated in the previous question, it is our opinion that the cooler space now available is adequate to meet the requirements that can be reasonably anticipated. It is believed that the existing freezer space together with such space now under construction will be sufficient to meet the demands for the early part of 1952. However, additional freezer facilities appear to be necessary in order to meet the demands that are expected to be placed on the industry during the latter part of 1952.

Question: Are there any areas in which you know of critical shortages of refrigerated space?

MR. OSGOOD: Insofar as critical shortages is interpreted as meaning that commodities requiring refrigerated storage space cannot be accommodated at all, there are none at the present time. The peak storage period for this year can be met even though freezer space in some areas will be very tight which might necessitate the storage of commodities in areas other than the most desirable one for the particular storer.

Question: Will you describe briefly the responsibility of DTA in connection with applications to commence construction and the allocation of controlled materials required under National Production Authority Order M-4A restricting construction?

MR. OSGOOD: Under NPA Delegation 14, as amended, authority has been conferred upon DTA to authorize construction schedules, to make allotments of controlled materials and to take certain other necessary steps in respect to the construction of facilities within its area of responsibility, which includes warehousing and storage. This delegation and DTA's procedures regarding the filing and handling of such applications are set forth in administrative order DTA 1, as amended November 8, 1951. Of course, copies of this order are obtainable from the information office of DTA or my office.

Question: What application form is used, where can copies we obtained, and where is the application filed?

MR. OSGOOD: As indicated in this same order, the application form is CMP-4C and can be obtained from any Department of Commerce field office or from my office. After the form has been properly executed, it should be filed with the Defense Transport Administration, Washington 25, D. C.

The existing refrigerated storage facilities are sufficient to meet the requirements of the present emergency with respect to cooler space but insufficient with respect to freezer capacity. Additional freezer capacity in areas of critical shortage will be accomplished to the greatest extent possible by encouraging the industry to enlarge its capacity.

Question: What criteria are considered in approving applications and making allocation of controlled materials?

MR. OSGOOD: Briefly stated, some of the criteria set out in DTA's Administrative Order 1, as amended, are are as follows:

1—Will the project contribute substantially to the conduct of military operations in the National defense?

2—Will the project provide an essential facility or service in the defense effort?

3—Will the failure to complete a project lawfully started be uneconomic or result in waste of controlled materials?

4—Is the need for the project urgent or can it be safely deferred?

5—To what extent are the requested controlled materials essential to the project? In other words, can noncontrolled materials be substituted to accomplish the construction in question?

Question: What percentage of DTA's requests for controlled materials are being allocated by DPA?

MR. OSGOOD: Referring specifically to the requirements of the Warehousing and Storage Division for controlled materials to be used in warehouse construction, I can state that materials required for the urgently needed facilities have been provided to date. However, the situation in respect to the allocation of controlled materials is continually changing as both production and requirements vary.

Question: What are the prospects for getting an increase in the allocation of controlled materials after the first half of 1952?

MR. OSGOOD: The prospects after the first half of 1952 are not at all good. As a matter of fact, certain of the controlled materials, particularly copper, will remain in very short supply for some years to come. Furthermore, increased military requirements for these materials, as defense industries get into full production, may further retard construction projects.

Question: How much refrigerated warehouse space has been authorized for construction by DTA since the inception of the Controlled Materials Plan?

MR. OSGOOD: DTA has authorized construction and allotted controlled materials to the extent of approximately 12½ million cubic feet of refrigerated space during this period, although in many instances actual construction will not be completed until later in 1952. This includes new construction as well as conversions of existing facilities. In addition, we are aware of a number of other projects not requiring sufficient controlled materials to call for action on our part. The above total of 12½ million cubic feet does not include these cases.

Question: What has been accomplished to date in respect to new construction?

MR. OSGOOD: We have no way of knowing when the construction of an authorized project has been completed and actually becomes available for storage purposes. Construction schedules as estimated by applicant when submitting his 4C application are not necessarily firm and construction is naturally subject to the many usual and unavoidable delays.

Question: Do you have any comments or criticisms on the way CMP-4C forms are being submitted by warehousemen?

MR. OSGOOD: Yes, data concerning the defense need for the facility is often insufficient or too vague to firmly establish the essentiality of such a facility in the particular location involved. It would be most helpful if the application were supported with specific information, such as letters from storers of defense items, increased production figures, occupancy rates for the area, etc. Further, in many cases, the inadequate answers to some of the questions indicate a failure to comprehend the full scope of the specific question involved. For example, the answers to items 80 and 90 of Form CMP-4C should include the cost of only those B products which appear in NPA Class B product directory (for example, refrigerating equipment, etc.) and not the total cost of the project.

We also find that quite often the controlled materials requested are not properly classified in accordance with the different types of steel as listed on the form: namely, reinforcing, structural, plate, etc. Careful consideration must be given to designing the structure so as to use adequate substitutes wherever possible and the least possible amount of controlled materials. DPA Press Release No. 121 of September 6, 1951, outlines accepted construction practices for the conservation of controlled materials.

Question: After they reach DTA, what is the step by step procedure in the handling of applications for controlled materials?

MR. OSGOOD: The procedure is as follows: A—Four copies, with supporting papers are received in communications and records division office and assigned a control number. B—They are then forwarded from communications and records division directly to Equipment and Materials Division for preliminary screening and recording of quantities of controlled materials requested. C—The entire file is then forwarded to Warehousing and Storage Division for review and appropriate recommendation. The time needed for handling in Warehousing and Storage Division depends on (1) need for obtaining additional data from applicant to substantiate his basis for the application. (Sec. 1c, Form CMP-4C), (2) needed clarification of value of B Products, (3) requests for excessive amounts of controlled materials, (4) improper classification of controlled materials, (5) lack of construction data, specifications, capacity, etc. (Sec. 1a, Form CMP-4C), (6) referral to other government agencies. When any of this additional information is needed, it must be obtained by telephone, wire or correspondence. Rapidity of response thereto determines the time held in warehousing and storage division. D—After review and written action by warehousing and storage division, the CMP-4C is forwarded to equipment and materials division. If favorably recommended by Warehousing and Storage Division, the Equipment and Materials Division usually concurs and issues CMP 13 to applicant authorizing construction, allotting controlled materials and assigning the right to use "DO" preference ratings to secure necessary B products and materials other than controlled materials. If denial or deferment is recommended by Warehousing and Storage Division, Equipment and Materials Division usually concurs and directs an appropriate letter to applicant.

Question: Where insufficient materials are available for all applications, what is the basis for determining the priority under which they will be approved in any calender quarter?

MR. OSGOOD: First priority is given to holdover applications for which available materials were insufficient to make full allotment of materials necessary for completion of delivery schedule. Secondly, to new applications indicating partial construction lawfully commenced and for which additional materials are required for completion. Third, to new applications in the order of their relative contribution to the defense effort. If, however, any project covered by a new application appears to be more essential and urgent than any of the foregoing, it is given top priority.

Question: What is the average length of time required to handle construction applications?

MR. OSGOOD: There is no way of determining an average length of time required to handle these applications. Under the present procedure, applications for materials required for any stated quarter must be filed in DTA 105 days prior to the beginning of that quarter so that requirements may be calculated. After that deadline, it usually takes from four to six weeks before applicant can be advised of the action taken, depending to a large degree on when DPA makes known to DTA its firm working allotment for that quarter.

Question: How far in advance of construction should an application for controlled materials be submitted to DTA?

MR. OSGOOD: DTA Administrative Order No. 1, as amended November 8, provides that applications for controlled materials must be filed 105 days before the beginning of the quarter in which the materials are intended for delivery. It is advisable to file the applications as far in advance of this required date as possible in order that we may obtain additional information where necessary and to permit more adequate planning in establishing the amounts of controlled materials required for any particular quarter.

Question: What are the criteria for approval of tax amortization certificates?

MR. OSGOOD: The basic criteria for approval of certificates of necessity are set forth in regulations issued by the National Security Resources Board, entitled "Issuance of Necessity Certificates under Section 124A of the Internal Revenue Code." In general, the criteria under the existing regulation are whether the facility described in any application for certificate is necessary in the interest of National defense during the emergency period and, if so, what portion of the facility is attributable to defense purposes.

Question: What has been the average percentage of amortization granted in approved certificates to date?

MR. OSGOOD: To date, the percentage of amortization granted in approved certificates for refrigerated warehouses has been approximately 65 percent. It should not be assumed, however, that this average will continue at the same rate. There are many reasons to believe this percentage will decrease by ten percentage points.

Question: Do you have any suggestions for improving the applications made on Form NSRB-140?

MR. OSGOOD: Yes, this form has recently been changed to form DPA T-2. As in the case of the previous question concerning the filing of form CMP-4C applications, data respecting the defense need for the facility are very often insufficient or too vague to establish with certainty the essentiality of the particular facility. The criteria in the existing regulation or in any new regulation which may be issued should be carefully reviewed and the application should provide adequate information to show that the case meets the requirements. Claims that the facility is essential for defense needs should be supported by specific written information such as letters from storers of defense material, local occupancy conditions, etc. Particular emphasis is placed upon the necessity to show that the expansion of facilities is not due merely to a normal increase in business and that the economic use for the facility will be reduced after the termination of the emergency period due to a diminishing demand for the product or service for defense purposes.

Question: What are DTA's plans for helping the refrigerated warehousing industry expand to meet shortages where they develop on short notices?

MR. OSGOOD: It is recognized that there is little anyone can do to expand a refrigerated facility on short notice due to the specialized nature of such construction and the technical equipment required to maintain proper temperature and humidity. Therefore, DTA is making its studies with a view to anticipating shortages at least 18 to 24 months in advance, thus enabling DTA to promote expansion before the shortage actually develops.

Question: Has NARW been able to give you any effective help in furthering your program at DTA?

MR. OSGOOD: Yes, the National Association of Refrigerated Warehouses has been of material assistance to DTA in furnishing information about many phases of the industry, including technical as well as statistical data. It has also assisted in disseminating information from DTA to the members of the industry.

Question: Is there any way in which warehousemen could help to accomplish your purpose more effectively?

MR. OSGOOD: Yes, one of the objectives of DTA is to accomplish its responsibilities through the voluntary cooperation of the industry with the least amount of government regulation by this administration. The warehousing industry can be of material assistance in making DTA programs effective if the industry will cooperate to the greatest extent possible in supporting requests for action.

Question: In terms of need for service, what do you think of the future prospects of the refrigerated warehousing industry?

MR. OSGOOD: A review of the occupancy figures of freezer storage space shows that during the peak period in World War II there were approximately 132 million gross cubic feet occupied as compared with approximately 166 million gross cubic feet

in October, 1950. These figures speak for themselves. The outlook for the industry appears to be excellent. The continuing rise of frozen food consumption plus new techniques, and new products such as frozen fruit concentrates, tending to expand the need for refrigerated space indicate that the industry is just "growing up."

Question: What is the manpower situation as it applies to the warehousing industry?

MR. OSGOOD: The reservoir of manpower in the warehousing industry approaches, to a large degree, the increasing overall critical situation. This is particularly noticeable in certain areas and in those job classifications where younger men are employed and are subject to calls to the military service. Although, at the request of DTA, the Department of Commerce has classified "public warehousing" as an essential activity, it does not follow that all employees thereof automatically fall into the "critical occupation" category established by the Department of Labor. In view of the increasing defense production program, we know the current tight manpower problem will become proportionately more critical. The industry should continually endeavor to anticipate future manpower requirements, retain present employees and initiate appropriate training and apprentice programs.

Question: Can DTA assist refrigerated warehousemen in getting priorities for machinery and equipment other than those types which are an integral part of the warehouse building? If so, how?

MR. OSGOOD: Yes, the items referred to are known as Class B products and they are listed in the NPA directory of Class B products. These items are usually available through normal commercial channels and every effort should be made to obtain them in that way. However, if exhaustive efforts to obtain these items in this way prove to no avail, then DTA can be of assistance. The procedure is an informal one and consists of writing a letter directly to DTA indicating the complete description of the item, the cost price, the purchase order number and supplier or suppliers, a statement of the efforts made to obtain the item, the delivery date promised with a priority order and the delivery date without priority assistance. DTA will then process the request through NPA for the issuance of a priority rating.

Question: Is DTA responsible for any measure of civilian defense planning as it applies to refrigerated warehousing?

MR. OSGOOD: Yes, the responsibilities of DTA include the coordination of warehousing and storage re-

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Bigger Handling Costs and Lost Time Natural Result of Careless Loading

WALTER J. WEISER, Traffic Manager
North American Cold Storage Co.,
Chicago, Ill.

DOES the average shipper or trucker know what happens when a trailer or car is loaded and care is not taken to load according to an intelligent manifest keeping the specifc types, sizes and grades separate? For the trucker and warehouseman it means loss of time and in the case of the cold storage warehouse that time can be double and three times that of the trucker.

The storing of perishables in cold storage has increased greatly and so have the problems connected with various fresh and frozen commodites in that the sizes, grades and types have increased and vary in value and now are being stored separate.

In the case of a truck load of 350 boxes of turkeys, 100 pounds per box, there can be from six to ten different items consisting usually of three grades with three to five sizes per grade. Chickens, 60 pounds per box, are even more complex where the size ranges and grades can run over 20 different items in a load of 500 boxes.

Sorted Load Saves Time

When a load of 350 boxes of turkeys arrive at the cold storage warehouse with seven different items the normal unloading time of a sorted load with a good manifest should be one and one-half to two hours using the driver or his helper and one warehouse dock man. The same load unsorted will take over three and one-half hours plus an extra man, who usually is an experienced checker, and restricts him to this one load when he usually can check two or three loads at one time.

A sorted load of chickens of 500 boxes can be unloaded in two to two and one-half hours by two men—unsorted it would take three men up to five hours to unload. For example try to visualize the opening of a trailer with 15 boxes of one size together when the manifest calls for 25 boxes it can be readily seen that we must pull this pallet out of the way and continue checking the next size which may also be incomplete and therefore set aside until the full amount is found. With 20 such items it means that two freezers men will have to wait until lots are complete before they can be piled in a sorted condition. Sometimes the balance of the first few items unloaded are found in the nose of the truck or bunker of the car.

We now should be able to see that a great deal of congestion develops when a load of poultry of from 300 to 500 boxes are spread out on a dock floor. Some cold storage warehouses have hold or sorting rooms where the load is placed and sorted at other than a rush period. Both methods of handling an unsorted load add up to loss of time and cost of handling.

Unsorted Load Means Additional Handling

For the shipper an unsorted load means a loss in appearance of his package due to the additional handling required when sorting and repiling. Another loss of time can be experienced through a poorly made up manifest or the lack of one. A sorted load without a manifest must be handled the same as an unsorted load.

Other types of warehouses and industries have this similar problem with non-perishable commodities and combat it by refusing loads that are not sorted.

There are charges for delays by the trucker but they do not begin to pay for the lost load that could not be picked up because his trailer was not unloaded in time. The warehouse charge covers only a small part of the time lost and not for the tie up of special experienced help or the increased danger of an incorrect delivery due to a poor manifest and unsorted load.

This problem of unsorted loads has been with us for some time and educational programs have been fostered by indivdual firms and a few truck lines with some success.

Reflected in Rates

It is hoped that a greater measure of interest is taken in this problem to prevent a reflection in the storage or truck rates due to loss of time and extra cost of handling.

The sorted load with a good manifest is of benefit to the shipper because he will be able to get trailer or storage space quicker due to his reputation of loading properly.

Clean loads—sorted and with a good manifest—will be cheered by the trucker who will get his equipment

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December 31 Cold Storage Holdings

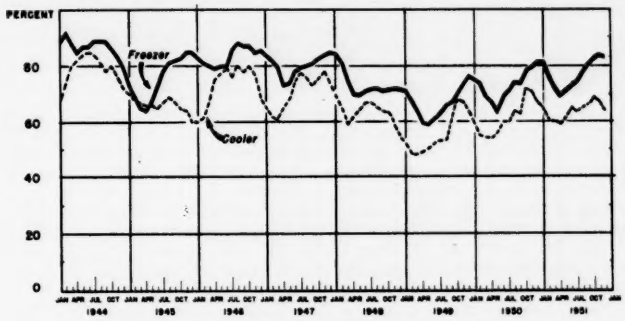
THE December 31 average national use of public cooler space decreased to 64 percent while freezer space utilization, at 83 percent, was unchanged from the previous month. During December the cooler occupancy level decreased 2 percentage points which compares with a 4 point decline reported during the 5-year period ended 1950. When compared with last year's operating level and the December 31 average space utilization, current cooler use throughout the nation was generally 3 points below 1950 and 2 points below average. Except for the East North Central and West South Central regions, all areas followed the pattern of a seasonal reduction in cooler use during December.

Utilization of freezer space, on the other hand, was above average for this time of year by 3 percentage points despite the fact that the expected November to December increase in freezer occupancy evidenced by the 5-year average did not materialize. Several areas, however, did reflect seasonal gains, the largest being reported in the West North Central States. City-wise, freezer space appeared to be at a premium in Buffalo, Philadelphia, Pittsburgh, Cleveland, Detroit, Minneapolis, St. Louis, Kansas City, Baltimore, Norfolk, Memphis, Seattle, Los Angeles, San Francisco, San Jose, and Modesto, as in each of these cities occupancy was 85 percent or better.

Net weight of cooler-held commodities decreased 13 percent during December as a result of seasonal reductions in noldings of fresh fruits, cheese, shell eggs, dried eggs, and other miscellaneous cooler items. The total in store by the end of last month amounted to 2.4 billion pounds which compares with 2.9 billion in store last year. The total weight of freezer-stored commodities increased 5 percent since November 30 and amounted to 2.3 billion pounds by December 31. These stores were 294 million pounds greater than holdings last year and 490 million pounds above the December 31 average.

National stores of fresh apples were reduced by 5 million bushels during December to 23 million. This compares with 34 million bushels in store last year and 27 million on hand December 31 during the 5-year period ended 1950. Fresh pears remaining in storage by the end of last month amounted to a little more than a million bushels which were about average for this time of year.

Frozen fruit stores reflected seasonal net withdrawals in the amount of 24 million pounds which left 330 million pounds in storage by December 31. Stocks last year totaled 334 million pounds while 336 million were average for this time of year. The November to December net decrease in frozen fruit stock was about a fifth greater than last year and more than a fourth greater than average for this time of year. Except for the increase in frozen apple stocks, seasonal net declines were reported for all of the frozen fruit items. However, the greatest net reductions were reported in holdings of cherries and strawberries—5 and 9 million pounds, respectively. Frozen orange concentrate stocks showed a net gain of more than 500,000 gallons since No-



Occupancy of Refrigerated Warehouses 1944-1951

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS)

	Dec. 31, 1951	Nov. 30, 1951	Dec. 31, 1950	Five-year Average
Meat and meat products, lbs.	947,203	687,974	769,708	733,721
Lard and rendered pork fat, lbs.	55,222	56,175	62,878	62,553
Frozen poultry, lbs.	302,144	309,943	281,972	273,873
Creamery butter, lbs.	26,857	59,349	105,192	60,869
American cheese, lbs.	193,323	204,683	187,157	140,884
Other cheese, lbs.	18,185	18,524	18,471	19,496
Shell eggs, cases	149	230	34	253
Frozen eggs, lbs.	67,833	95,143	47,310	89,354
Apples, bu.	22,821	28,000	33,621	27,030
Frozen fruits, lbs.	329,753	354,078	334,525	335,961
Frozen vegetables, lbs.	492,909	522,076	425,170	340,566
Frozen fish, lbs.	192,656	205,675	178,617	168,842

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		Dec. 31, 1951 (%)		Nov. 30, 1951 (%)		Dec. 31, 1950 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,140	6,021	51	92	52	91	64	87	54	83
Middle Atlantic	33,850	32,442	64	85	68	87	71	85	66	81
East North Central	25,464	23,689	67	83	63	83	68	83	64	80
West North Central	8,212	12,962	55	86	59	78	74	85	70	84
South Atlantic	8,560	6,948	65	89	72	88	59	82	64	83
East South Central	2,680	3,151	79	90	84	89	81	83	70	84
West South Central	6,809	7,430	63	64	57	65	58	62	65	74
Mountain	1,509	2,562	59	92	61	92	59	70	60	74
Pacific	13,502	21,811	68	80	74	80	58	77	65	76
United States	103,726	117,016	64	83	66	83	67	81	66	80

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Dec. 31, 1951		Nov. 30, 1951		Net Piling Space (000 Cu. Ft.)		Space Occupied Dec. 31, 1951		Nov. 30, 1951	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	7	16	50	82	56	81	61	.....	82	.....	82	.....
Middle Atlantic	997	1,284	56	79	63	89	1,818	260	64	80	59	92
East North Central	3,326	5,124	84	77	86	62	2,936	711	94	96	85	80
West North Central	342	2,199	99	77	90	63	7,922	3,894	92	87	87	77
South Atlantic	572	4,381	79	60	84	53	844	122	85	100	82	100
East South Central	.....	.....	.....	.....	.....	.....	67	64	100	86	100	86
West South Central	153	65	85	85	92	100	156	116	100	100	100	100
Mountain	.....	41	.....	78	92	68	526	400	97	100	97	100
Pacific	2,378	2,781	52	78	29	77	1,623	372	95	95	100	100
United States	7,775	15,891	71	73	62	67	15,953	5,939	87	93	86	82

NOTE:—Blank spaces indicate that insufficient returns were received.

vember 30 to total 11.4 million gallons by December 31. Other frozen juices fell off to 25 million pounds by the end of December. Seasonal withdrawals of frozen vegetables reduced national holdings to 493 million pounds. This compares with 425 million on hand December 31, 1950, and average holdings for this time of year of 341 million pounds. The 29 million pound December net withdrawal equalled the 1950 net change but was 20 percent greater than average. Stocks of frozen peas were down 17 million pounds from the previous month to 129 million pounds; frozen lima beans were reduced by 9 million to 83 million pounds.

About a third less cream was in storage on December 31 than a month earlier with national holdings reduced to 16 million pounds.

Creamery Butter

Creamery butter stocks declined to 27 million pounds by December 31 as net withdrawals totaled 32 million pounds during the month. Current holdings were only about a fourth the stocks on hand last year and a little more than two-fifths as great as average December 31 stores.

American cheese stocks were reduced by 11 million pounds and by the end of December amounted to 193 million pounds which was a record high for that date. Total cheese in storage reflected the December net decrease by being reduced to a total of 222 million pounds which compares with 212 on hand December 31, 1950 and the 164 million pound average for this time of year.

Shell Eggs

Shell egg stocks remaining in storage on December 31 totaled 149,000 cases. Frozen egg supplies were reduced to 68 million pounds as net withdrawals during December amounted to 27 million pounds.

Frozen poultry stocks moving contra-seasonably during December reflected a net decline of 8 million pounds as compared with a 12 million pound gain last year and an average 9 million pound gain reported during December for the 5-year period ended 1950. Current poultry holdings of 302 million pounds exceeded average December 31 stores by 28 million pounds and last year's stocks by 20 million pounds. Turkey stocks were down to 107 million pounds, while roasters and fryers each increased to 20 million pounds. Broilers increased to 7 million pounds while fowls were reduced to 96 million pounds and ducks to 8 million.

Frozen Meat

National stores of beef increased to 225 million pounds with December net gains reported to be 43 million pounds. These stores were more than 50 percent greater than last year's holdings and the December 31 average stocks.

With a greater than average into-storage movement of pork (191 million vs. 159 million) national stores amounted to 573 million pounds which compares with 499 million on hand last year. Frozen pork holdings had increased during December to 359 million pounds; dry salt pork totaled 44 million pounds; other pork amounted to 170 million pounds.

Other meat items also were in greater supply than a month earlier —149 million as compared with 124 million pounds—which brought national stores of meats in refrigerated storages to 947 million pounds. Current holdings exceeded last year's supply by about 25 percent and were almost a third greater than the average holdings.

Lard and rendered pork fat in storage on December 31 increased to 55 million pounds with a reported net gain of 16 million pounds during December.

Refrigerated stocks of frozen fishery products on December 31 totaled 170 million pounds as a result of net withdrawals amounting to more than 9 million pounds were reported during the month. Cured fish in storage decreased to 23 million pounds. Last year's supplies of frozen and cured fishery products were 158 and 21 million pounds, respectively.

Storage Outlook

Cooler utilization during January should continue on its downward cycle as fresh fruits, cheese, and eggs move out of store. A normal change for this time of year is a reduction of 4 points which would place the estimated cooler utilization at 60 percent on January 31, 1952. Also, freezer space should reflect a seasonal reduction as frozen fruits, vegetables, butter, and poultry move from store. Should the 5-year average pattern prevail, freezer occupancy on January 31 will be reduced to 82 percent. However, with greater than average reductions reported in holdings of frozen fruits and vegetables and with seasonal withdrawals of poultry, beginning one month earlier, the reductiton in freezer use may be greater than the 5-year pattern would indicate.

Canadian Holdings of Fruits and Vegetables

THE Dominion Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on December 1, 1951.

Apples in cold and common storage on December 1, 1951 amounted to 5,278,000 bushels as compared with 8,101,000 bushels December 1, 1950.

Frozen fruit holdings in storage and factories December 1, 1951 amounted to 23,101,000 lbs. as compared with 23,334,000 lbs. November 1, 1951 and 16,882,000 lbs. December 1, 1950.

Stocks of frozen vegetables in storage and factories on December 1, 1951 amounted to 12,979,000 lbs. as compared with 14,391,000 lbs. November 1, 1951 and 12,530,000 lbs. December 1, 1950.

Shelled peanuts stored in commercial refrigerated warehouses as insurance against insects, contamination, and loss of natural flavor and color. The temperature is 32-34F., the relative humidity is 60-70 per cent, and the rooms are clean and dry.

THE STORAGE OF EDIBLE PEANUTS

Study conducted by Georgia Experiment Station shows that peanuts to retain top quality must be stored under controlled temperature and humidity conditions

PEANUTS for edible use may be stored in the shell for many months in ordinary dry storage warehouses or elevators without apparent loss of quality. A large proportion of peanuts are stored as farmers' stock peanuts and are shelled and moved into processing channels as needed. But there are several objections to handling peanuts in the shell. The shells are bulky, and a considerable percentage of them are cracked or partially removed during picking, leaving the kernels unprotected. There is no satisfactory method for keeping insects from damaging the peanuts; during the warm months, staleness and rancidity develop at such a rapid rate in the unrefrigerated stocks that it is almost impossible to supply processors on a year-round, shell-as-needed basis.

Shelling and grading reduce the storage space required to one-third and the weight by almost one-third, and many of the largest end-users (confectioners, salters, bakers, and peanut butter manufacturers) purchase the year's supply of shelled peanuts in the autumn months and hold them under refrigeration until they are needed for processing. On the other hand, shelled peanuts are more vulnerable to attack by insects, molds, and rodents, and the seed coats and cells immediately beneath are often bruised, cracked, or broken during shelling, permitting free oil to escape. Contact of surface oil with air soon causes staleness, loss of flavor, and rancidity unless the peanuts are refrigerated. The colder the refrigeration temperature and the less air in contact with the nuts, the longer shelled peanuts will remain fresh.

The storage of edible peanuts has been studied in a research project at the Georgia Experiment Station sponsored in part by The Refrigeration Research Foundation. Results were published in a bulletin prepared by Helen Thompson, S. R. Cecil and J. G. Woodruff. The essential parts of this bulletin dealing with refrigeration are reviewed in this article.

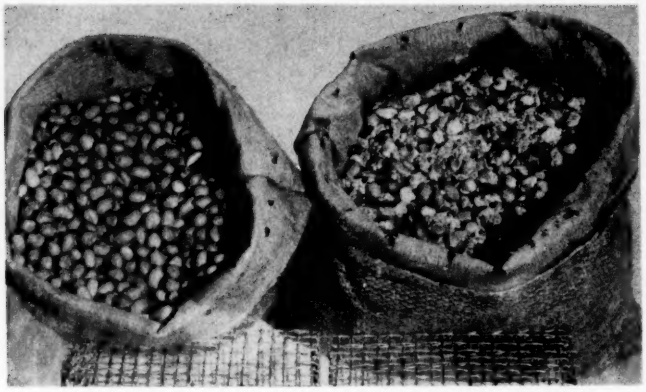
The composition of the peanut kernel renders it rather difficult to store for long periods without some loss of quality. It contains about 45 per cent oil, which is subject to oxidation and rancidity as well as to the ready absorption of foreign flavors; with about 27 per cent protein and 21 per cent carbohydrate, it molds or rots easily at high moisture levels. When the moisture content drops to excessively low levels the loss of weight represents possible loss of profit in handling, and the kernel becomes brittle and tends to shatter during processing.

Peanut Production

The problems of storing peanuts have increased with increased production. National production has increased from 350,000 tons in 1930 to more than 1,000,000 tons in recent years. Peanuts are a major crop in 13 states, with four states producing more than 150,000 tons each. Georgia leads all other states with a present production greater than that of the entire nation in 1930.

Fortunately, the heaviest consumption of peanuts occurs soon after harvest when the weather is cool, and storage has been a serious problem only with that part of the crop which is held over to the next year. As the weather warms up in spring and summer, shelled peanuts not under refrigeration deteriorate rapidly. For this reason refrigerated storage of remaining stocks has become more general and reaches its peak during the five warm months. There were in refrigerated storage in the United States on July 1, 1950, 45,172,000 pounds of shelled and 2,190,000 pounds of unshelled peanuts.

Since peanuts are in demand the year round for processing and for export, a study has been made of the problems encountered in storing them with and without refrigeration. This study includes comparisons of refrigerated and common storage from the standpoint of quality, moisture



Effect of refrigeration on insect infestation. Peanuts at left were stored six months at 33-37F. They retained their bright color and fresh flavor and were not damaged by insects. In the bag at right, stored six months at room temperature, there is 99.3 worm infestation.

relations, absorption of foreign flavors, molding, types of bags for storage, and storage insects.

To determine the status of cold storage of peanuts, questionnaires were sent to representative handlers throughout the industry. The findings are based on replies received from 36 shellers, 82 warehouses and 63 end users. It was learned that peanuts were stored under refrigeration in 27 states, with Georgia leading with more than 13,000,000 pounds. The data indicate that the four-fold increase in refrigerated storage of peanuts, from 1941 to 1946 was general throughout the industry.

Refrigeration Maintains Quality

Results of this storage experiment over a five-year period, show that refrigeration maintained the quality of shelled peanuts for long-time storage. Peanuts held at 0F. for five years were essentially the same as when placed in storage. At 15F. aroma and flavor were practically unchanged through the third year of storage, with only a very slight darkening of color. After one year at 33F., flavor was slightly lowered, but during the second year at this temperature a loss of flavor occurred as a forerunner of staleness, which was definite by the end of two years' storage.

Peanuts held at 50F., were unchanged through the sixth month, but were beginning to show some staleness after a year, with noticeable darkening of color. At 68F., there was some darkening and loss of flavor at six months, and the peanuts were unacceptable by the end of a year. Peanuts held at 86F. were not considered to have good quality after the third month, and were unacceptably dark and stale after six months.

Foreign Flavors Absorbed

Peanuts may absorb foreign flavors in storage rooms. Experiments were set up to investigate flavor absorption under commercial conditions similar to those which had been reported by the industry. Bags of peanuts were placed on storage in five rooms at four plants. All of the rooms were held at temperatures around 35F., but relative humidities and products stored in the rooms varied considerably. One of these rooms was the peanut room of a large refrigerated storage warehouse, and the nuts stored in this room were used as controls for the other storages.

Room 1 was the meat curing room of a locker plant which was being used for a limited amount of storage. The peanuts placed in this room were sampled at various positions in the bags to determine the rate and depth of penetration of the odor of cured meat which permeated the atmosphere.

The flavor of the curing meat was detected in the nuts near the outside of the bags after one week, and had become quite objectionable by the end of the first month. Four inches beneath the bag surface, or about half way between the outside and the center of the bag, the foreign flavor was first detected after two weeks, but did not become very pronounced until the fourth month. In the center of the bags no meat flavor showed up during the first month, and it was not very strong at the end of the fourth month, when the peanuts were removed from storage.

Rooms 2 and 3 were, respectively, the fruit room and the meat room of a wholesale grocery warehouse, and Room 4 was the holding room used by the horticulturists at the Georgia Experiment Station.

Time, types of commodities in the room, and degree of fullness of the storage space were factors in the rate of absorption of flavors in these rooms. The nuts in the fruit room, which contained a larger proportion of odorous products than the others, were definitely off-flavor in one month, as compared to four months in the meat room and to one year in the horticultural room. Unshelled peanuts were much less subject to absorption of flavors than shelled nuts, requiring variously from six to twelve times longer to acquire the same degree of contamination under comparable conditions.

Room 5 was the peanut room of a commercial warehouse, in which conditions were closely controlled at 35F. and 65 to 70 per cent relative humidity. After two years in this room the only changes in shelled or unshelled peanuts were a slight rise in moisture content and a very faint odor of burlap bags in the nuts. Both shelled and unshelled peanuts stored in this room for two years were in excellent condition.

Relative Humidity

Observations over a period of several years by the authors and by numerous others throughout the peanut storage industry have confirmed the fact that uncontrolled relative humidity in refrigerated peanut storage rooms nearly always mean too high relative humidity, especially when other products are stored with peanuts. A concrete example of the ill effects which may result under commercial conditions from lack of humidity control was provided by determination of moisture changes in the bags of peanuts stored for the study of flavor absorption reported above (Rooms 1 and 2).

At 35F. and relative humidity 90 per cent the moisture in the shelled nuts adjacent to the bag walls increased by almost one per cent in one week, and the peanuts were soggy by the second week. By the third month mold appeared on both the outside and inside of the bags. The peanuts in the region half-way between the bag wall and the center were getting too moist by the end of the first month, while those at the center were not too wet until after the fourth month. This part of the experiment showed that where humidity was extremely high the outside nuts were

badly damaged in a very short time, even though the nuts down in the bag were still good.

Mold Control

From tests over a period of years under widely different storage conditions, it was shown that molding is controlled by (a) moisture content of the peanuts, which should be below eight per cent; (b) relative humidity of the air, which should be below 75 per cent; (c) temperature of the storage room, which should be as cold as practical; (d) air circulation, which should be sufficient to keep the humidity and temperature uniform; (e) surface contamination of peanuts, which can be reduced somewhat by ozone and air purifiers; (f) size of the peanuts, since small kernels molded more readily than large ones.

Insects are a major problem in peanuts stored at temperatures below 48F., especially if they are shelled; and prevention of insect infestation was the outstanding reason given by end-users for refrigerated storage of peanuts.

Peanuts may be protected from insects (a) by storing at temperatures below 48F.; (b) by fumigating for 24 hours at 70F., with 9:1 mixture of carbon dioxide and ethylene oxide at the rate of 24 pounds per 1,000 cubic feet or with 7.3 mixture of ethylene dichloride and carbon tetrachloride at the rate of 1.5 ounces per 120-pound bag in insect-proof bags; or (c) by repeated fumigation.

Recommendations

The pertinent facts of this bulletin of 44 pages are given in recommendations on handling and storage.

The most important steps in handling peanuts immediately after harvest are getting them cleaned and drying them to a safe moisture content. Subsequent procedures include keeping them dry and protecting them against insects, rodents, and loss of natural color and flavor, as well as preventing the absorption of off-flavors and the development of rancidity.

Since the shells protect the desirable qualities in edible peanuts, it is good to store them unshelled as long as possible. However, the extra space required for unshelled peanuts makes it impractical to store large quantities of them under refrigeration, and unrefrigerated peanuts are subject to attack by rodents, insects, and slow rancidity, especially during warm weather. The method of preserving the highest quality in edible peanuts is to shell and grade them and place them under refrigeration. The following are recommendations for refrigerated storage of shelled peanuts.

1—Cleanliness and dryness are of primary importance. Thoroughly clean and whitewash the peanut storage rooms at the beginning of the season. A good whitewash may be made of 50 pounds of hydrated lime, 15 gallons water, 10 pounds of salt, 2 pounds alum, and a bar of soap. If mold, mildew, or other fungi become a problem, "Cuprinol," manufactured by Cuprinol Division, Darworth, Inc., Simsbury, Conn.; or "Fungicide No. 974" (⅓ ounce per 50 gallons), made by Carbide and Carbon Chemicals Division of Union Carbide and Carbon Corp., New York, may be used.

2—Inspect the peanuts for grade and quality when received for cold storage. Keep a record of the weight, moisture content, rancidity, general appearance, and the percentages of rotten, moldy, discolored, or insect-infested peanuts in each lot.

3—Maintain the storage temperature as near 32F. as practical, with air circulated throughout the room. The relative humidity should be 60 to 70 per cent.

4—Store peanuts in a separate room, or store only with products having a low moisture content without strong odors. Rice-popcorn, dried milk, dried eggs, candies, other nuts, bocked chocolate, and canned or bottled goods are usually safe for storage of peanuts.

5—If undesirable odors develop in the storage room, remove them as quickly and completely as possible by the use of carbon filters, ozonizers, or other means. There is no practical means for removing strong foreign odors that have actually been absorbed into the peanuts, so such absorption must be prevented. It must also be remembered that ozone is a powerful oxidizing agent which can be used around peanuts only at infrequent intervals and in concentrations isn't strong enough to be faintly detected by smell.

6—If it is necessary to cold store peanuts with a moisture content above seven per cent, these peanuts should be dried in storage to a safe moisture level, or used within two months.

Montreal Warehouse Declares Dividend

DIRECTORS of Montreal Refrigerating and Storage, Limited, have declared stock dividend of one 5 percent cumulative redeemable preferred share $10 par value for each one common stock held, payable December 31, to shareholders of record December 29.

Refrigerated Warehousing

Large Precooling Plant To Open in Florida

A LARGE pre-cooling plant erected at a cost of more than half a million dollars is nearing completion at Belle Glade, Fla., by the Pioneer Growers Corp., Frank Dooley, general manager. The schedule calls for completion of the plant by February 15, with part of the enormous facility to be in operation and production before that time.

Represented in Pioneer are 24 growers who, combined, have between 10,000 and 12,000 acres under cultivation. Last season, this cooperative shipped out 2,000,000 packages of vegetables, or 3800 railroad carloads, with distribution to every state in the union and all provinces in Canada.

Extremely modernistic in appearance, the new pre-cooling place will replace one which was destroyed by fire last December. At the time of the fire, Pioneer was in the process of doubling the old plant's capacity. The new plant is completely fire-proof.

Capacity of this modern cooler is 2000 crates per hour, or 30 to 40 cars a day. Vegetables requiring precooling include celery, corn, escarole and chicory as the principal crops, and cabbage, radishes, lettuce and romaine.

This plant, when completed, will have eight sluices. The average plant has only three precooling units. The plant utilizes the conventional water cooling system. As crates move through the coolers on mechanical conveyors, they are almost submerged in ice water dripping off refrigeration coils.

After the ice bath, the crates will be loaded directly into railroad cars or trucks, or held in the storage room. The new plant has a storage room of 25-car capacity.

Propose Changes in Egg And Poultry Regulations

A MEETING was held at Kansas City, Mo., January 10 and 11, to discuss proposed revisions and changes in instructions covering the processing of egg products, and in regulations governing the inspection and grading of poultry. Industry members, inspection and grading representatives, and marketing, educational, regulatory and public health officials were present. The meeting was called by the Poultry Branch of the Production and Marketing Administration, U. S. Department of Agriculture.

Insulation For Refrigerated Warehouses

IN THE conference on insulation at the A.S.R.E. convention held at New Orleans December 2-5, J. V. Grubbs represented the refrigerated warehouse industry. He is superintendent of the cold storage department, Alabama State Docks. Mr. Grubbs called attention to the large amount of insulation used in public refrigerated warehouses to protect 412 million cubic feet of space. It is a necessary barrier, he said, between the changing high temperatures outside and the steady low temperature in which the goods are stored.

Insulation Classified

Mr. Gubbs said he had learned in the hard way that there are three kinds of insulation construction.

1. Experimental—for short life.
2. Temporary—for a few years.
3. Permanent—planned and constructed to last the life of the structure holding the insulation.

The right one of these should be considered when an insulation job is anticipated.

It's obvious that these three kinds of insulation construction are necessary, practical, and very important, so long as they are used in their respective places, but, when the users, or the refrigerating engineers, take upon themselves to use temporary plans with permanent expectations, we should know that sooner or later we are in for a spell of trouble. It has been said "A job worth doing at all, is worth doing well", but there are many people today who do not believe in this saying, but do the job by any method in order to finish it quickly.

Today, many of us old users of insulation do not know the meaning of coefficent, conduction, convection, or even heat resistance, and many other technical terms necessary to calculate the efficency of insulation, but we do realize when trouble develops with our insulation, that someone, somewhere, has made an error! However we "old timers" do have a yardstick by which we try to measure insulation and we use it often. It goes like this—is your insulation as good as cork, and, if it is, you have a good one.

Insulation Requirements

He said his experience had taught him that all insulation requirements should be carefully selected. Furthermore, the selection and figures should be compiled by a competent refrigerating engineer, and the engineer in charge, should take into consideration the following facts:

First—The best kind of insulating material suited for the particular job.

Second—The proper thickness of insulation required for efficent operation with the least condensation.

Third—The best known method for applying the insulation.

Fourth—Secure the services of the best known applicator possible.

Many times in the past, they had discovered in their building, cork walls and ceiling installation where only hot pitch was used. In each case, the insulation separated from the structure, and repairs were necessary. With these experiences in mind, he proposed that when planning to install permanent insulation for low temperature rooms constructed of concrete or brick, wooden strips or blocks should be inserted in the structure, so that the first layer of insulation can be nailed to them. This method will form a base for the balance of the insulation to be fastened to.

Installing Second Layer

Long after old cooler rooms have been completed, and it is desired to increase the thickness of the insulation, don't just stick more insulation on, but, apply 2"x 4's, by bolts through the old insulation, to the walls, and stick the first layer of insulation between the 2x4's and then, the second layer of insulation can be nailed to the wooden strips over the first layer.

This method of application will reinforce the old insulation and hold the new much longer than is generally thought. They have used this idea in several places, and it works nicely.

Mr. Grubbs explained that his plant is located on the Alabama State Docks, which is a 30-million dollar enterprise, in Mobile, Alabama. It is a small plant, compared to some, he said but they handle thousands of tons of merchandise through channels of import, export and domestic.

Merchants Dividend

THE Merchants Ice & Cold Storage Company, Louisville, Ky., declared a regular quarterly dividend of $1.50 a share on preferred stock payable December 27 to share owners of record December 18.

Solidified Cream New Storage Product

CREAM or milk solidified by the addition of gelatine can be cut, wrapped or handled, yet dissolves quickly in hot coffee, tea or cocoa, according to Louis A. Scholz, inventor of Patent 2568369, assigned to Manufacturers Corp., Baltimore, Md. In this patent he describes a variety of products made from milk or cream and gelatine or comparable substances for use in beverages. The solidified coffee cream is prepared according to one procedure, simply by soaking gelatine in the cream for an adequate length of time and at the proper temperature.

Warming and stirring are necessary for a smooth solution. The mixture is poured into molds and allowed to jell. It can then be individually packaged, preferably in tin or aluminum foil, and group packed and shipped in corrugated cardboard cartons, and is said to last better under refrigeration than the unprocessed item. It may be, decorated, colored or printed on by conventional means. It has the consistency approximately of the white of a hardboiled egg although this can be varied at the will of the processor.

Another type of product comprises powdered milk plus gelatine. This can be redissolved in water to yield a milky mixture suitable for feeding invalids or children, the patent states. Instead of cream or milk powder it is possible to use raw whole milk, pasteurized whole milk, homogenized milk, skim milk, evaporated milk or condensed milk, it is said, and can be used for ice cream products as well as hot products.

Gums other than gelatine may be employed, such as gum acacia, gum arabic, albumen, agar or starch. However, according to Mr. Scholz, gelatine is superior to any of the others. Instead of sucrose, it is possible to use glucose, lactose, fructose, levulose or dextrose, increasing the amounts to give the desired sweetness.

The taste of the gelatine component of the mixture can not be detected in coffee or tea when present in a range of between one percent to 40 percent by weight. Soluble coffee can be included in these, gelatine plus milk, products in sufficient strength to provide one "cup of coffee with" from each wrapped or packaged unit, upon the addition of hot water only. Possible "cubed" hot water drinks are coffee, tea and hot chocolate or cocoa. These can be made to form, without sediment or undissolved particles remaining.

Trade Associations—How They Meet Expanding Economic Needs

THE work and accomplishments of trade associations, particularly in the refrigerated warehousing field, was discussed by Wm. Dalton, executive vice-president of the National Association of Refrigerated Warehouses, at a meeting of the Canadian Warehousemen's Association held at Niagara Falls, Ontario, Canada, September 20 and 21.

There is much similarity in these associations, Mr. Dalton said, in what they do; in why such associations are needed more than ever before. It is only natural that with the growth in populations on both sides of the border new problems have been created economically, politically and socially. For instance, we know factually that in the United States the steady population growth to the 150 plus million point that presently exists, new ideas and new problems have created tremendous pressures. Our needs have changed. Our concept of economics and business freedoms have even changed.

Association Idea Grows

These concepts and the infiltrated thinking of millions of individuals have not only changed political thinking in both of our countries; they have brought about the development of big labor and mammoth trade unionism. They have been responsible for big government. They have also caused small business to grow into big business so that the present economic pattern is determined by all of these factors. It's only natural that trade associations have grown along with these elements to the point where they now—today—occupy a prominent and dynamic position in our respective economic political and social scheme of things.

It's not so many years ago that the average trade association existed primarily for one—or all—of three purposes: They were: (1) sponsoring a convention once a year, (2) issuing a monthly bulletin, (3) answering an industry inquiry from a member occasionally. This operations format has been completely and dramatically changed in the last 15 to 20 years. With the advent of changes elsewhere, it has become vital for business organizations like ours to be vocal, articulate, militant and effective in their representation of their respective industries. The fact that people are confused about businessmen has in itself caused new activities and procedures in the trade association field.

You're not as popular with your public as you used to be. Consequently, the growth of public relations, both internal and external, among trade associations, is one of the outstanding and most important developments occurring in this field. In our association—as in yours—we have taken our story to the people, to every nook and cranny in our respective nations. We have had to do this. In most cases, the "opposition" was already there. As a consequence, we have been partially responsible for creating a new "selling climate" for our respective industries. It has been necessary—and profitable for you—for our trade associations to

Representing the Industry

represent you in many places.

Speaking as an N.A.R.W. employee, it's been a pleasure for our particular activities to represent you and your needs as your "Washington service station." It's been our increasing pleasure to represent you at the "courts of justice" before government agencies and legislative bodies; among your customers—yes and before the public in general. Public opinion being as extremely important as it is in these days of human relationships, the contest for men's minds is ever present—and it's up to us as one of the world's great trade associations to be vocal in that contest.

It's a pleasure for me to talk about N.A.R.W.—not only before groups like this; I'm always proud to call attention of anyone who will listen to some of the significant factors about the refrigerated warehouse industry. For instance, I like to talk about such things as the fact that over five million cubic feet of refrigerated space has been added to our industry since Korea, and that in the past 12 months something like 10 million cubic feet represents our expansion figure; in the years '48 and '49 our industry spent over $10 million annually on modernization and repairs —to do a better public service job for its customers; in 1949 we paid over $25 million in taxes; in 1950 the actual average cost of putting one man to work in refrigerated warehousing was $13,275—as against the total average of industry generally of $8,000.

You've heard president Johnson of N.A.R.W. talk about some of our legislative problems. You've heard him sound the alarm in regard to what's happening in Washington and elsewhere to our so-called free economy. Your association is rightfully concerned about these things. Some of the reasons for our concern are explained by the inefficiency we find in our American government. We think we have the finest government in the world, but there is something wrong when we learn such things as the fact that in one government agency alone it costs $10,293 to spend the sum of $31,148. We know there's something wrong—and inefficient—when we learn that in a recent survey of four governmental agencies in Washington it was discovered that—among 48,000 employees—the average off-duty work record of these employees is seven work weeks a year.

N.A.R.W. has embarked on a real program of membership service. We have dressed up, stepped up and revitalized such association services as our valuable and business-getting directory of public refrigerated warehouses. Over 3,500 storers of perishable foods are using this location "bible". Membership inquiries and resultant answers have become a major part of our time-consuming operations. Our contacts with government agencies' officials and legislative representatives have increased tremendously. Our activities on behalf of our industry public relations-wise—with our customers, affiliates and the general public—have grown and grown. We're going places in our industry—and in our association.

Merchants Open New Minnesota Warehouse

THE new refrigerated warehouse constructed by Merchants Refrigerating Co., New York, at Hopkins, Minn., was opened for business December 10. The new warehouse was built on a 16-acre tract in northeast Hopkins. It provides almost three acres of warehouse space and is equipped with blast freezers to provide fast freezing and low freezing conditions.

John B. Frane is manager of the Hopkins plant and the supervisor is Edwin M. Neylon, vice president of the company, and manager of the St. Louis plant.

On the day following the opening, Arthur N. Otis, president, and members of the board of directors, were hosts to producers, processors and wholesalers of perishable foods at the inspection of the plant.

Refrigerated Storage May Help Save Texas Onion Crop

AN experiment to refrigerate onions may save tons of the sweet blackland Bermudas for Texas farmers each year, a group of horticulture experts said in Dallas recently. They were here to check the experiment being conducted at the Alford Refrigerated Warehouse, 318 Cadiz.

Onions are said to have poor keeping qualities in refrigerated storage. Because of that, onion farmers have been forced to throw all of their crops on the market at once. This has jammed the market, and has caused their harvests to bring low prices. Then when winter comes, cheaper grades of onions, many of them from Mexico, are shipped in and bring several times the prices that the Bermudas brought.

Samples Examined

Representatives of Texas A. & M. College and the Department of Agriculture opened a vault in the Alford warehouse, where 100 bags of onions were placed last July 2. In one group of the onions, after five and a half months, loss by rotting was only 3.65 per cent. And this bunch had lost only a little over 9 per cent of the original weight. If this showing can be made on a large scale, it will mean that the onions can be stored in the summer when they are plentiful, and placed on the market in the winter.

Meeting with Fred Alford, manager of the warehouse, were Dr. Henry A. Jones of Beltsville, Md., chief of onion and potato breeding of the United States Department of Agriculture; Dr. G. W. Adriance, head of the horticulture department of Texas A. & M. College; H. J. Mack, research assistant of A. & M.'s horticulture department; and W. B. Cook, agricultural agent of the Missouri-Pacific Railroad.

The experiment is being sponsored by the Refrigeration Research Foundation in cooperation with the Alford warehouses and A. & M. College.

The 100 bags of onions were bought last June 28 at $1.50 a bag. (Cheaper grades are now selling for $5.50 a bag.) "They were the worst possible onions we could have got, because the onions were full of water last season," said Mr. Alford. The 100 bags were divided into several rooms, each with different temperatures and humidity.

Before the experiment, authorities believed that relative humidity of 75 per cent was the best for onions in refrigeration. But in the room with 75 per cent relative humidity, and 35-degree temperature, the rot loss was 8 per cent. In the room with the same 35-degree temperature, but 50 per cent relative humidity, the rot loss was only 3.65 per cent.

Next summer, the men plan to ship in eighty carloads of onions and place them under the preferred humidity and temperature. If they keep as well as the ones did this year, it will be a pretty good indication that onions can be stored satisfactorily into the winter, Mr. Alford said. One other factor is to be determined in the test — how well the refrigerated onions will hold up after they are removed from the warehouse until they can be sold from the grocer's shelf.

Mr. Alford believes that by removing the onions cold from the warehouse, it will accumulate moisture which causes the onion to spoil quicker. So he plans to warm up the onions before removing them to the outside air.

Low Temperature Storage Keeps Vegetables Fresh

NEW evidence that night storage at near freezing temperature holds the key to freshness in many vegetables in retail stores, is reported by the U. S. Department of Agriculture. The evidence comes from a Beltsville, Md., laboratory set up to simulate the fresh vegetable section of a grocery store.

William E. Lewis and John C. Hansen, USDA plant scientists, found that night temperatures as low as 32F. will prolong shelf life of radishes, green onions, lettuce, broccoli, cauliflower, and bunched carrots and beets from one to three days longer than vegetables held both day and night at higher temperatures. Snap beans remain fresh and attractive longer when stored at night at 40 to 50F. Sprinkling with water or garnishing with ice when displayed through the day was highly beneficial in preventing wilting of leaves and sponginess of roots of bunched vegetables. Night storage at 50F. was satisfactory for cucumbers and these tests indicated that sprinkling was not needed.

The study shows that over-night storage in "walk-in coolers" or in iced produce barrels will extend the shelf life of produce even when no equipment is available for daytime refrigeration.

The findings are reported in detail in Handling, Transportation and Storage Office Report No. 247. A limited number of copies are available and may be obtained from W. T. Pentzer, Plant Industry Station, U. S. Department of Agriculture, Beltsville, Md.

Meat Packers to Discuss Government Controls

GOVERNMENT price controls and the necessity of removing them from the industry will form the chief topic for discussion at the sixth annual meeting of the Western States Meat Packers Association. This association is made up of independent meat packers, wholesalers, purchasers and suppliers of the nine western states. The meeting will be held at the Biltmore Hotel in Los Angeles February 13-15. Members of the association are interested in price roll-backs on hides and tallow and the effect of new government meat grading standards.

The array of internationally noted speakers and the large expansion of new developments in packing machinery and equipment will feature the meeting, which is expected to draw an attendance of 3,000. The association now has over 400 meat firms in the nine western states.

Convention speakers will include Allan B. Kline, president of the American Farm Bureau Federation; United States Senator Wallace Bennett of Utah; Major General John R. Dean, president of the Wine Institute; W. A. Williams of the Portland, Ore., Union Stock Yards, and Tony Wham, Los Angeles advertising man.

Cold Storage in Israel

IT IS reported that cold storage facilities in Isreal are to be quadrupled within the next two years, according to plans worked out by the Investment Centre of the Israel government. The present capacity is about 25,000 tons of refrigerated space available in 33 small and medium sized plants and 66 cold storage rooms in agricultural areas. The total amounts to about 2,700,000 cu. ft. of refrigerated space for the new nation. Plans call for a 150 percent increase in storage facilities by the end of 1953. Centers designated for development are Acre, north of Haifa, Migdal Gad, south of Tel Aviv, and Elath, on the Gulf of Aqaba. It is planned to have over 3,000,000 cu. ft. of storage space completed by the end of this year.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE INDUSTRIES

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THIS MONTH IN BRIEF

A re-issue of the Orrison "ice sizing" patent was granted by the United States Patent Office December 25. The new patent contains two revised claims and four new claims.

A complete merchandising plan for ice men to use in selling the meat-on-ice idea to market operators. This field offers a potential new market for nearly four million tons of crushed ice per year.

The use of ice for sweet corn from field to consumer reduces losses for grower and retailer and provides a quality product for which customers are willing to pay a premium price.—Report on a study conducted in Illinois.

The Klages Coal & Ice Co., Akron, Ohio, recently honored Ward J. Motz who had rounded out 50 years of service with the company.

One of the largest industrial refrigeration installations is operated by the Celanese Corporation of America at Amcelle, Md., with a total capacity of over 10,000 tons. In 1951 four enclosed ammonia compressors were installed, each having four cylinders of 14-inch bore and 12-inch stroke.

Review of The Ice Industry

THE following letters were received too late to be included in the review of the ice industry in the January issue of ICE AND REFRIGERATION. Their comments on the various topics are as follows:

Ice Tonnage

Illinois: Only in isolated cases, especially where existing plants had acquired new properties, was there an increase in tonnage.

Indiana:—Our tonnage for 1951 was approximately 20 per cent less than in 1950. We feel, a large percentage of this loss was due to the unseasonably cool summer that we have had now for the past three years. However, I do not think the ice industry can help but realize that a lot of their tonnage has gone to mechanical refrigeration. As in our case, most of the hotels, larger night clubs, taverns and dairies have put in ice cube machines and flake ice machines that will take care of their normal operations. The only ice they purchase from us is in case of break down of their equipment or when they cannot produce sufficient quantity for special occasions. Poultry dressing establishments in this area have been using considerable tonnage in the last two or three years. This business in 1951 was probably up 50 to 75 per cent over 1950.

Missouri: Our ice sales for 1951 were less than the year before, both tonnage and dollar value. There was not much difference in the temperatures of 1950 and 1951 as both were cool summers, but in this community we had considerable less people and business was slower. The loss of ice business to mechanical refrigeration has been quite noticeable.

Utah: Our ice sales for railroad ice, bunker and body ice, and crushed ice for trucks increased 11.4 per cent while domestic ice decreased 18 per cent.

Costs

Missouri: Our costs were kept in line with income compared to other years.

Utah: The costs were out of line compared to last year and previous years.

Processed Ice

Illinois: Processed ice continues to show increased sales, depending upon the efforts made.

Indiana: We are selling processed ice at our platform and at ice vending stations at three additional locations in the city, besides making deliveries to commercial stops. Also, we are selling ice cubes to a number of commercial stops in addition to our platform in containers of 48 cubes per bag, 72 cubes per bag, 250 cubes per bag and 500 cubes per bag.

Missouri: We sell sized ice in three sizes, also cubes in paper and plastic bags. Our sales of processed ice are increasing compared to other years, and we believe it is one of our best methods to hold our sales.

Utah: We are selling crushed ice and cube ice in larger quantities than ever before.

Vending Stations

Missouri: We have one ice vendor at our plant location, vending twenty-five pound blocks, and it has been very satisfactory.

Utah: The answer to better business is the vending machine station, and through this medium we will be able to stay in business.

Selling Refrigerators And Other Appliances

Indiana: We are still selling ice-using equipment, both commercial and domestic, but our ice-using equipment sales for 1951 were off from 60 to 75 per cent as compared to 1949 and 1950.

Missouri: We are selling ice refrigerators, and chests, and also renting them, but the government ruling that we cannot rent for domestic use for more than three-month periods has handicapped us materially in our rental business.

Utah: We do not sell ice refrigerators or any other ice-using appliances.

Advertising

Missouri: Our advertising for 1951 was mostly newspapers and radio, which is the same as we plan to use in 1952.

The Ice Industry

Selling More Ice

Illinois: Management must be more sales minded; someone must be charged with the responsibility of sales, and quality of product and service must live up to all the claims made.

Missouri: Without doubt the real need in the ice business is more ice volume. We have secured some additional crushed ice business in the local grocery stores here, and at Fulton for vegetable icing.

Utah: Right now the vending machine offers the best hopes of enlarging the ice market.

Outlook for 1952

Indiana: I am quite sure that if we could get a good warm summer in 1952, our tonnage would very materially increase.

Missouri: We think the best thing that could happen to the ice business for 1952 would be a normal or above normal summer instead of the pleasant cool summers we have had the last several years.

Utah: I think that business will be better in 1952.

Ice Keeps Prize Vegetable Displays Fresh At Indiana State Fair

THE Indiana Ice Industry participated as usual in the Indiana State Fair this year, supplying crushed ice for many of the exhibits in the Agricultural-Horticultural Building.

The prize garden exhibit is pictured below. The Indiana Ice Association has been supplying ice for this exhibit for three years, the ultimate goal being to have the State Fair Board ice all the vegetable exhibits. These prize exhibits, with crushed ice, stay in excellent shape while the uniced ones deteriorate quickly.

Another picture shows the wall competitive exhibit of the DeKalb County Vegetable Growers Association. This was an unsolicited exhibit and came as a surprise, evidence of the acceptance of field icing of sweet corn. This exhibit won second prize in the building.

First prize was won by the exhibit of the Indianapolis Vegetable Growers Association. The Association has cooperated with this group for three years. This has produced a maximum of publicity for ice with a minimum amount of expense and it is recommended to other organizations as a good way of telling the ice story.

Crushed ice keeps vegetables fresh in prize garden exhibit at Indiana State Fair.

Exhibit of Indianapolis Vegetable Growers Association, winner of first prize.

Exhibit of DeKalb County Vegetable Growers Association, winner of second prize.

SELLING ICE FOR MEAT COUNTERS

In this article is outlined a complete merchandising plan for ice men to use in selling the "Meat on Ice" idea to the meat market operators in their local communities

R. W. DAVIS
Union Ice Company,
San Francisco, Calif.

In the January issue, a report by Mr. Davis told about the studies made on using ice in mechanical meat counters. These studies showed that ice prevents shrinkage and other losses and shows a potential market of 3,718,530 tons of ice each year. In this article, he suggests to ice men how they can go after and develop this new business.

WHEN we started selling this "Meat on Ice" program in California, the first thing we did was to prepare a 52-page portfolio for our managers, supervisors and route foremen. This portfolio gave them a very complete picture of the program. Addressed to the meat market operator, it provides complete information covering the original research, some of the findings on what it will do for meat, and calls to their attention the enormous savings that are possible. Then we prepared other bulletins for direct mailing to meat market operators, telling the same story.

We have held meetings with some of the packers, telling them our story, and they are some of our best salesmen. We used two-page advertisements in a grocers' magazine, "Does Meat on Ice Really Work?" We had meetings with mechanical refrigerator distributors. We found they were very much interested, and we learned that they too, have their troubles, with complaints from their meat case customers, and now some of them are recommending the use of ice in their mechanical meat cases.

Helps for Grocers

We have held some meetings with the grocers. For them we prepared a large banner something like our produce banners, for placing across the wall back of the meat counter, and we found it much easier to get this banner up on the wall than we did the produce icing banners in the grocery department. We have a small folder we have given away in large quantities to meat men to put in the packages explaining the advantages of meat on ice.

The portfolio mentioned above is really being used. We left it with the owner of a chain of meat markets to sell him on the idea of trying it out, and our man at San Pedro said, "For five weeks now I have been trying to get that book way from that man and he won't give it to me." We called on him and this book was on his desk. Our man said, "Are you through with that now. Can I take it?"

He said, "No, I would like to keep it one more week because, I'll tell you what I'm doing. I am having every one of my supervisors in each of these markets study this and give me a written report on it."

I think what he was doing was getting them into the proper frame of mind so when he suggested to each market operator that they try ice, they would be willing to do it. We have run into a little trouble, where we have sold the owner of a market but we forgot to sell the manager and the butchers who were in that market, and no matter how good it is, if

IT'S THE NEW WAY . . . IT'S THE NATURAL WAY . . .

IT'S THE Ice-Way

GROCERY-MARKET NEWS

TO MORE PROFIT FOR THE FOOD MERCHANT

NUMBER 2

VOLUME 1

DOES MEAT ON ICE REALLY PAY?

• Yes! say 73 San Diego Market Owners

SANDY'S MEATS

HERE'S HOW EASY IT IS TO TRY MEAT-ON-ICE IN YOUR OWN MEAT CASE

STEP ONE

STEP TWO

STEP THREE

STEP FOUR

36-40°

Front page of the Grocery-Market News which tells and shows by examples and pictures that Meat on Ice really pays.

Presented at the 34th annual convention National Association of Ice Industries.

Here is a picture of Boney's Market, 6911 El Cajon Blvd. San Diego, California, Calvin Glenn manager. Mr. Glenn says he recommends Ice for meat counters, 100 percent.

they have made up their mind that they are not going to use it, it won't stay there.

Starting the Program

I would suggest that as a part of your getting started, you begin making a study of your meat markets. Go into them and watch for that dry appearance that comes over the meat, and the darkening. If it isn't a bright, cherry red color, if it gets darker than that, it is probably because it is drying out.

Talk to some of your meat men and ask them what some of their problems are, and you will find that they are very much like the ones we are talking about here. Then I suggest that you select three or four small markets to make this trial and before you talk to these men, look over their equipment. A lot of these small stores are handling meat only because they know they have to, and they have terrific problems. For one thing they have very large losses.

We have made it a point to start our campaigns in each city in the smaller, neighborhood markets. By doing this, our ice plant managers get practical experience in stores where the losses from shrinkage, trimming, spoilage, drainage, etc., are the greatest, due, mainly, to the slow turnover. Also, the owner of the market is usually the meat butcher and is in a position to see what effect the ice is having on his meat. Only after we have a considerable number of such installations do we go after the larger markets and the chains.

The Meat on Ice program was started in California by the Union Ice Company the middle of August. Only three months later, the middle of November, they were selling ice to 300 meat markets. A new market for ICE amounting to approximately 450 tons of crushed ice per month. And they have just begun.

We offer to supply the paper required and the first icing free. Thus we can tell the man that it won't cost him a nickel to try it out and see for himself how it will work in his own market.

Operating Details

Another very important thing is to have a good thermometer, a little pocket thermometer costing about $2.50. When you have received his permission, take a temperature reading. This is more important than you might think. We neglected to do that and later we found markets where the ice didn't do a bit of good. It happened in one market that the temperature was 29F so naturally the ice had no effect at that low temperature. We find around 36 to 38 degrees is best. If you get below that, the ice meltage is not fast enough to supply moisture and also to do a quick cooling job. If you get above 40, the ice meltage is faster than it really needs to be and the excess ice isn't doing any good. Try to hold it in the range of 36 to 38 degrees. And then, after the ice has been in the case for three or four hours and it has settled down to its operation, run the test again.

Then check the drainage. The case should be water tight, instead of leaky as some of them are. As a rule, you will have no drainage problem because the ice melts slowly.

You may run into the problem of a leaking meat case. We have had some of those and we have lost some installations because of that, but we think we have the answer. We line it with alumium foil, then punch a hole through the foil, then put in a nipple with a rubber gasket top and bottom and a couple of lock nuts and you have a very effective drain. If the case is very long, you may put in several drains and hook rubber tubes onto the nipple. A case with such a liner properly installed will be watertight, and it will hold ice with very little investment on the part of the meat man.

Tell The Customer

The next thing is to explain to your customer what you are going to do, and how you would do it, and tell him what has happened in other markets; that you don't know whether it is going to happen in his or not, but you will experiment and furnish the ice and the papr if he will furnish the meat case.

We have used a lot of different kinds of paper. Some have used a couple of layers of ordinary butcher paper. Some have used a plastic coated locker paper. Some have used heavy wax paper. A building paper with a asphalt liner has been used very successfully at our San Diego branch. This paper is very tough and it really takes a beating. A paper that isn't waxed is liable to flake off and get down in the drain and cause trouble.

This "something new" is a catchy idea for the meat business is in a tough spot right now and if there's any business that needs a new idea or something to talk about right now, it is your retail meat store. One of them said to me recently, "I don't care if it doesn't do a thing; it is something for us to talk about and something new and we want to use it."

However, do not neglect to explain to them that in other markets ice has kept the meat fresher, it has

retained the color much longer; therefore you think it is safe to assume that the quality will be better than if the meat was allowed to dry out and they had had to trim it to make it bring back some color for the customer to look at. And suggest to him that he sell this idea to his customers, explain to them the advantages of this new ice display method and the value of the ice.

Setting Up the Ice And Meat Display

This gives you an opportunity to put that ice bed in high enough so three or four inches will show above the lower glass line. Unless you do this, most of the operators will cover up all the ice with paper, and this is not so good because the air can't get at the ice to pick up the moisture. A better plan is to show a generous supply of ice along the length of the counter.

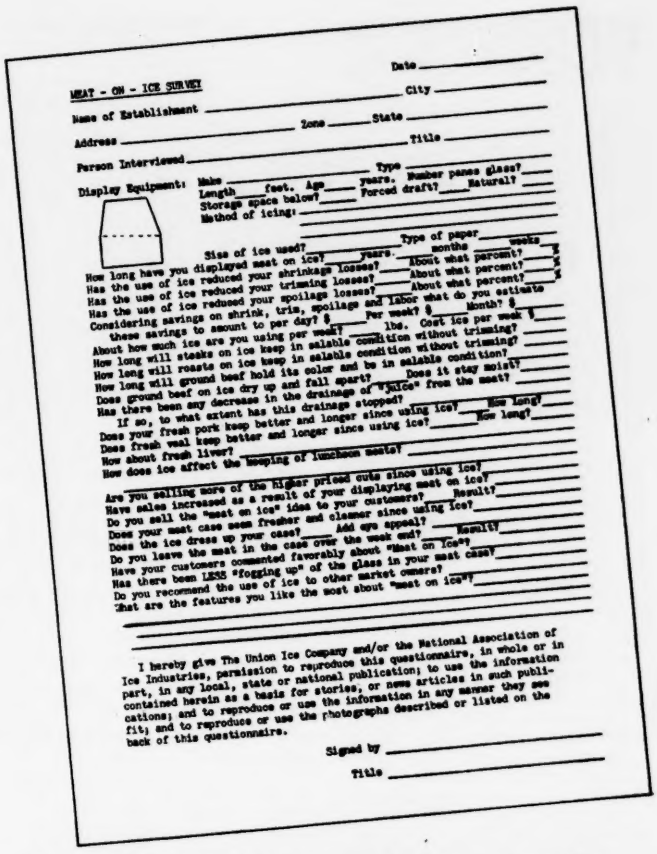
Meat markets in Syracuse, N. Y., have been buying crushed ice for their mechanical meat cases for eighteen years, with astounding results. This "Meat on Ice" idea is now beginning to take hold in California, and it offers all ice distributors a new market for nearly three million tons of crushed ice per year.

Again, point out to them the importance of contact cooling. Recently I took my thermometer and held it in the air stream of a self-serve meat case operating at a temperature of 32 F. It took that thermometer 9¾ minutes to drop from 85 degrees down to 33. I then touched it against a piece of ice and it dropped from 85 down to 33 in 17 seconds. That is a visual demonstration of the capacity of ice to do a rapid cooling job.

Contact Cooling

It is very important, that we get that contact cooling, set the meat on paper and then on the ice, or they can put it on paper and in their trays and then put their trays on the ice. That combination gives them quick cooling, and also the moisture. See to it that they don't cover the ice up so the air cannot get at it.

The subject of temperature is very important. Remember, if the temperature in the case, when you first check it, is down around 34 or 33 F (your bigger, faster-moving markets with newer equipment, as a rule will be held at a lower temperature than the neighborhood market), be sure that when you add the ice, you do not pull the temperature down to where you will freeze the meat. In some cases they will have to adjust the setting of their temperature, because the combination of the ice and the mechanical refrigerator will give them a lower temperaure and the ice won't melt properly. After the ice has been in the case for a while, adjust it to around 36 to 40, not over 40 degrees.



MEAT - ON - ICE SURVEY

Date _____

Name of Establishment _____ City _____

Address _____ Zone ____ State _____

Person Interviewed _____ Title _____

Display Equipment: Make _____ Type _____

Length ____ feet. Age ____ years. Number panes glass? ____

Storage space below? ____ Forced draft? ____ Natural? ____

Method of icing: _____

Size of ice used? _____ Type of paper _____

How long have you displayed meat on ice? ____ years. ____ months ____ weeks

Has the use of ice reduced your shrinkage losses? ____ About what percent? ____ $

Has the use of ice reduced your trimming losses? ____ About what percent? ____ $

Has the use of ice reduced your spoilage losses? ____ About what percent? ____ $

Considering savings on shrink, trim, spoilage and labor what do you estimate these savings to amount to per day? $ ____ Per week? $ ____ Month? $ ____

About how much ice are you using per week? ____ lbs. Cost ice per week $ ____

How long will steaks on ice keep in salable condition without trimming? ____

How long will roasts on ice keep in salable condition without trimming? ____

How long will ground beef hold its color and be in salable condition? ____

Does ground beef on ice dry up and fall apart? ____ Does it stay moist? ____

Has there been any decrease in the drainage of "juice" from the meat? ____

If so, to what extent has this drainage stopped? _____

Does your fresh pork keep better and longer since using ice? ____ How long? ____

Does fresh veal keep better and longer since using ice? ____ How long? ____

How about fresh liver? _____

How does ice affect the "seeping of luncheon meats" _____

Are you selling more of the higher priced cuts since using ice? _____

Have sales increased as a result of your displaying meat on ice? _____

Do you sell the "meat on ice" idea to your customers? ____ Result? _____

Does your meat case seem fresher and cleaner since using ice? _____

Does the ice dress up your case? ____ Add eye appeal? ____ Results? _____

Do you leave the meat in the case over the week end? ____ _____

Have your customers commented favorably about "Meat on Ice"? _____

Has there been LESS "fogging up" of the glass in your meat case? _____

Do you recommend the use of ice to other market owners? _____

What are the features you like the most about "meat on ice"? _____

I hereby give The Union Ice Company and/or the National Association of Ice Industries, permission to reproduce this questionnaire, in whole or in part, in any local, state or national publication; to use the information contained herein as a basis for stories, or news articles in such publications; and to reproduce or use the information in any manner they see fit; and to reproduce or use the photographs described or listed on the back of this questionnaire.

Signed by _____

Title _____

Questionnaire form used by Union Ice Company to obtain Meat-on-Ice information from customers and prospects. This not only helps the company but focuses the attention of the customer on their losses from shrinkage, trimming, spoilage, markdown and drainage.

Uses Ice in Cooler

One man, the first one who tried it in San Diego, now has trays in his walk-in cooler where he has crushed ice and he piles all the meat he can put on the trays. He is very, very happy about it.

We have some market operators who use snow for the ice bed but crusher run seems to work just as well. They are also throwing away their green trim and are using the larger size ice, cube size or bar size, as decoration along the front of the case and in between their meat trays. It looks very beautiful.

Piles of Ice

Some operators have taken their trays and everything out and dumped in about 15 or 18 inches of ice, so they can hardly get the meat pans into the case. One man who is using large size ice told me his business has increased and he is selling more of the higher priced cuts of meat. Everything is on paper except the liver and the ground beef. He told me this "meat on ice" has been the best thing that ever happened to him. So you

will find they have a lot of ideas that are their own and as long as they are basically sound, let them go ahead with them.

We are still experimenting on the best type of paper to put between the steaks and the roasts. Some are using a plastic coated locker paper; some are using ordinary butcher wrapping paper; some an interleaving paper. Right now, I wouldn't recommend any one in particular until we have a chance to do some more testing.

Questionnaire Covers Experience of Operators

We have a questionnaire form that covers most of these questions, the savings, etc. We have found it is very valuable, after say a week's time, to survey a new customer, jotting down the answers to these questions on cutting down shrinkage, trimming, spoilage, markdowns, drainage, etc. Practically all market operators I have talked to, tell me that the reduction of those items runs from 85 to 100 percent.

Now, a lot of them haven't thought it out that far. They know it has helped them but when you bring it down on paper and they see it, then you ask them, "All right, about what percentage do you estimate this has saved you?" I think the lowest I have ever heard was 5 percent and the highest, 25 percent. But you will find they don't have any specific ideas on the amounts of their losses.

They haven't really checked it, and you have to get them to make as close an estimate as they can, and once they say that that is their figure, then you can say, "All right, now, if you multiply that by the volume of business you are doing, you will realize the saving this ice is bringing you."

Other Selling Points

There is a very definite strong selling point in the safety factor of having ice in the meat case. We had one man whose compressor broke down twice in one week. He said "For a very few cents worth of ice I saved about $200 worth of meat on two different occasions in one week."

Another man has a store in a town where the power went off for about six hours. He had approximately $600 worth of meat in his case. He said "That meat was just as beautiful when the power came back on as when the power went off."

Ice makes it possible for a neighborhood grocer to have a good selection of meat, very similar to our story on produce. Before, he was afraid to cut more than maybe one T-bone steak and a couple of round steaks and a little ground beef, because it turned black and he couldn't sell it, but now it will hold a good color for several days. Usually the standard answer on steaks and roasts holding a good color without trimming, is from four to six days. The usual answer without ice is from one to two days. The meat on ice looks better, it looks fresher, it has more appetizing appeal, better salability to it, better color.

A release issued by the Research and Engineering Department of the National Association of Ice Industries expresses gratification with the interest shown by ice men in the Meat-on-Ice project. A copy of the final report on this research work will be mailed to members of the ice industry as soon as it is released from the University of California. In the meantime a complete merchandising program is being planned, including appropriate selling aids.

Many have asked us: "Is there a specially built case that is made for this combination ice and mechanical refrigeration?" And, there again is a research problem.

Combination Deal

When you get into this program, you probably will see the value of making a combination deal out of the reach-in refrigerator. In some units there is already a fan and a small fin coil could be added. They never have complained about how a forced draft commercial keeps products, but the ice consumption was too high. If we can cut that down to a reasonable figure, they will still use ice and they will be very happy about it.

How much ice does it use per foot per case? In San Diego, it is running about 25 pounds per running foot per week. In our San Pedro area, for some reason, I think they are in bigger markets on the average, it is running about 35 pounds per running foot per week and I haven't as yet heard one squawk about the cost of ice.

Our percentage of rejections, after trying ice, is running less than 8 percent, contrary to our expectations which were that rejections would be about 40 percent, with 60 percent carrying on. Our San Bernardino branch has lost but one out of 27 stores.

Results of Work

Now briefly, some comments on the results of our work. The San Fernando Valley organization started about August 18 and up to October 25, they had 32 markets using ice. The San Pedro operation passed the 44 mark about a month ago. Right now (November 13) we have approximately 300 meat markets in California using ice, at the time of year when normally ice sales are decreasing.

In San Diego they estimate that nine routes would have been taken off by this time of the year, but instead of their business dropping, it has increased.

We recently took over some distributors in the Long Beach area. At a meeting one evening one of them said: "Three weeks ago I was trying to sell my route and my truck for $695. There are now six markets on the route using ice in their meat cases. They are all big ones. Now I wouldn't sell that route for $2500 without the truck." That is how fast this Meat-on-Ice program can work.

Explosion Causes Damage To Maine Ice Plant

THE explosion of an ammonia compressor at the Penobscot Bay Ice Company, Rockport, Me., caused damage estimated at $8,000, company president Maynard Graffam reported. Mr. Graffam gave damage to the compressor and other ice making machinery in his plant as $6,000 and said that the resulting loss of 3,000 pounds of ammonia which filtered up through the First National store caused less than $1,000 damage to stored foodstuffs. The ice making plant is located in the basement of a brick block in Rockport's business district.

Ice Plant Fire Smoldering in Sawdust

FIREMEN from the City of Bridgeport, W. Va., are getting tired of traveling to a neighboring town of Aetnaville to fight a fire at a local ice plant. It's been burning since last July because of the large quantity of sawdust used for storage. The fire has continued to smolder and frequently continues to flare up. The State fire marshal has advised that the building be torn down.

Harvesting sweet corn and dumping freshly picked ears into tank of ice water.

CORN ICING INCREASES PROFITS

Report on study in Illinois shows demand for iced corn will increase, even at premium price, as consuming public becomes aware that high quality is available.

A COMPLETE report on the hydro-cooling and icing of sweet corn, sponsored by the Illinois Association of Ice Industries and conducted by B. F. Hartline, Marketing Specialist, Illinois Department of Agriculture, has been issued. Mr. Hartline will continue with this project on an expanded basis and will inaugurate hydro-cooling of peaches during 1952 with cooperation of the Illinois Association.

The method used in this study was to gather the corn early as possible in the morning while the temperature was comparatively low and the sugar content high, hydro-cool it by immersion in ice water for a sufficiently long time to bring the temperature down to near 40 F, package or layer ice it in wet strength paper bags, and deliver it immediately to refrigeration at a central warehouse for later distribution to retail outlets.

Wholesalers Cooperate

The first step was to find a wholesaler or chain store who would go along on such a project, pay a premium for the product, and give it enough follow up in the retail outlets to arrive at some conclusions as to the results attained. Kroger Company, Carbondale, Ill., through their produce merchandiser, Bill Clemmons, agreed to cooperate on the bulk of the harvest. They serve some 90 stores in southern Illinois, western Kentucky, and southeast Missouri. About half these stores buy their corn locally from their customers when available. A & P, through sales manager C. J. Perry, agreed to handle a few shipments in Chicago to test the carrying qualities of the treated corn. Both agreed to pay a premium commensurate with the additional cost to be incurred by the grower.

In the spring of 1951, two groups of growers in extreme southern Illinois were organized to exploit this process. One of these was in Anna and the other in West Frankfort. Each participant was asked to put in a small acreage so that his risk would not be great. They agreed to grow the best possible quality and to market only that corn which would meet the requirements of U.S. No. 1 grade. Plantings were scheduled so as to provide a continuous supply to the buyer. It was also agreed that harvesting and processing of the corn would be done by one crew who would go from grower to grower as the corn matured. This would insure an efficient and consistent harvest and would save the grower the necessity of interrupting his normal operations. The two varieties selected for this year were Gold Rush (early) and Golden Cross Bantam.

The Illinois Association of Ice Industries, furnished the finances for the processing equipment. It was originally intended that a concrete vat and conveyor be put in, but in view of the costs involved and the fact that the future of the project was unknown both as to volume and location, it was decided to utilize temporary and improvised facilities. Local ice companies furnished the ice at a wholesale rate and the West Frankfort Ice Company furnished the location and considerable help in the processing. C. P. Austin, Manager of Research and Engineering Division, National Association of Ice Industries, made available all the information they had on handling sweet corn and aided in securing the necessary bags.

Wet Strength Paper Bags

The wet strength paper bags were made of three sheets of 50 lb.wet strength Kraft, 20x39 inches with 7 inch bottom and with $\frac{3}{8}$ inch vent holes 6, 12, and 18 inches from the bottom to drain off melted ice. In actual use it was found necessary to punch additional holes in the bottoms of the bags as they were preferably and frequently handled in a vertical position. These bags held 5 dozen ears of corn and 25 pounds of crushed

ice and were secured by stapling or twisted wire fasteners.

As often happens in projects of this kind, it was found that costs ran higher than anticipated. This was principally due to the small volume which prevented taking advantage of labor and time saving techniques and other savings that volume production would allow. However, net returns compared very favorably with other crops and most of the growers felt that they were satisfactory for an initial undertaking.

The Anna project did not do well as far as yield or quality was concerned as compared with the West Frankfort project. Inclement weather at time of planting and apparently poor seed resulted in a very poor stand of corn. An extremely rainy season during cultivation and spraying periods left the fields grassy and weedy and allowed the corn ear worm to get a start. Then a dry period at harvest time shortened the yield. However, the West Frankfort crop, which was planted later, was excellent. Stand was fair, cultivation was clean, and quality and worm control were almost perfect.

Harvesting

A close check was kept on each field and it was harvested at the correct time to realize full succulence. It was found that two harvestings took most of the quality corn. The ears left after the second trip were generally not too well filled out and had more worm damage. This was especially true of late plantings. The crew started early in the morning (5:00 a.m.) and usually had the day's pick completed by 9:00 a.m. The corn was gathered in orchard picking bags and transferred to field crates or dumped in a truck in bulk. The labor time on harvesting by this method was high but volume would not permit other systems which might have been utilized. Average time for harvest and hauling was 3.7 minutes per dozen ears. The corn was kept in the shade until taken to the processing location in order to retain the early morning coolness as long as possible. An attempt was made to grade the corn as it was gathered and all bad ears were discarded. As soon as the morning's pick was completed, the corn was hauled to the icing tanks.

Processing

Hydro-cooling of the corn was done in tanks of previously prepared ice water at near 32 F. Ordinary stock watering tanks were used as they were easily procured and were satisfactory to work over. These tanks were filled about ⅓ full of water and approximately 450 pounds of crushed ice were thrown in. 60-80 dozens of ears of corn were put in each tank and more crushed ice put on top. Weighted racks were then placed in each tank to force the corn below the water level.

Another study of the use of ice to preserve sweet corn from field to consumer, conducted in Illinois is reviewed in this article. Results of this study back up those obtained from other such projects, namely:

1—There is a definite demand for precooled and packaged sweet corn.

2—Customers prefer and will buy it, even at a premium price.

3—It offers the ice industry an opportunity to increase its ice tonnage in corn growing areas.

Corn was allowed to remain in this ice water bath until its temperature reached 40-45 F. The average time of immersion on this project was 35 minutes. However, this time was dictated by speed of sacking. It was found that the desired temperature could be had in 20-25 minutes depending upon the field temperature of the corn. With a means of circulation of the coolant, this time could be shortened. The following table shows the average atmospheric, field, and after hydro-cooling temperatures.

	High	*Low*	*Avg.*
Atmospheric temperature	94F	81F	90F
Field temperature of corn	94F	77F	85F
Temperature of corn after hydro-cooling	45F	39F	43F

After the corn was sufficiently cooled, it was sacked in the wet strength paper bags. First 2½ dozen ears were placed in the bag and covered with a layer of 10-12 pounds of crushed ice followed by another 2½ dozen ears and topped with another 10-12 pounds of crushed ice. The mouth of the bag was then secured and the bag was put under a tarpaulin until time to deliver to the warehouse. Average time for processing was 3.1 minutes per dozen ears. Distance to warehouse was 20 miles.

Ice size used was a mixture of fine and coarse. It was felt that this would give both the advantages of quick cooling and preservation of the coolant over a long period of time. This latter is most important inasmuch as deliveries to the stores from the warehouse are frequently made in the early morning before the stores are open and the corn is out of the cooler for some time. Average ice consumption was 7.5 pounds per dozen ears at Anna and 9 pounds at West Frankfort. This figure would have been reduced with more volume since the initial icing of the water uses almost twice as much ice as subsequent tanks.

Kroger would not at first believe that the paper bags would stand rough treatment after they became wet and asked that a minimum amount of ice be put in each bag. However, they proved their toughness and since the desired temperature was not being maintained to the retail store, the amount was increased. Very few cases of ruptured or damaged bags occurred through the entire season.

Shipment Retains Quality

One shipment of 50 bags of corn was made to Chicago to A&P (360 miles). This corn left Anna in a dry express car at 3:00 p.m. and was delivered to their warehouse cooler at 8:00 a.m. the following morning. The bags contained a maximum amount of crushed ice at packing time. Inspection in the A&P cooler 22 hours after packing showed a small amount of ice remaining in each bag. The corn looked better than it had at time of packing. The shucks were green and crisp looking and the temperature had been maintained. This shipment had been without outside refrigeration for 21 hours.

The atmospheric temperature at that time was extremely high and it was proved without a doubt that long hauls with this method of processing are practical. The bags stood up well with only one rupture in the 50 and no corn lost from this one. With refrigerated cars or trucks this distance could have been greatly extended. Lack of volume and absence of refrigerated transportation prevented further work along this line.

Warehousing and Retailing

All along the distribution line it is an absolute necessity that hydro-cooled sweet corn be kept refrigerated as completely as possible in order that the work and expense put into it will not be negated. If due care is exercised in handling, there is no reason why corn which has been held for several days should not remain in excellent edible condition. In one test this year, corn was held in a 33 F cold storage room for seven

days and then served to a group of people who all declared that it was as good as any they had ever eaten.

At the Kroger warehouse the corn was palleted and delivered by work lift truck to the cooler where it was held until the delivery trucks were loaded shortly after midnight. Delivery to the retail stores was made from 4:00 a.m. on to the end of each truck's run. This was the only time between the warehouse and the consumer that the corn was out of the cooler and this was the period when the larger ice sizes paid off.

At the retail store the necessary amount of corn was put on either ice or mechanical refrigerated display and the remainder kept in the walk-in cooler until needed. Temperature tests at this point never ran over 55 F and usually under 50 F.

In personal contacts, the salesmen were urged to take some of this corn home and try it in comparison with corn which had not been hydrocooled. Their enthusiasm after this "taste" test was undoubtedly a contributing factor in the success of the project. At West Frankfort, samples of the corn were given away at local stores on the day the corn was introduced and it was featured on the public service programs on the local radio station.

Display cards were prominently displayed with the corn and read as follows:

Hydrocooled
"FIELD FRESH" SWEET CORN
Quality Corn Refrigerated from Field to You
Roastin' Ears at Their Best

The corn was tipped in the stores with the result that there was no discoloration of the grains as is usually found in corn tipped at the time of harvest. The appearance or "eye appeal" was far superior to any which had had routine handling. There was little or no loss from spoilage since the corn was sold out each day before it had a chance to deteriorate to the point where it was unsalable. Customers asked for more and were disappointed when it was not available.

There was no chance to determine the actual increase in sales that might have resulted from handling this corn since there was insufficient volume to follow up on demand. It was felt that selection of one or two stores and "pushing" the product at these locations would give a false picture of consumer acceptance. However, except for two days when there was an unusual large amount of corn to be harvested, Kroger's demand was greater than the supply although this supply was approximately equal to the normal volume of fresh corn sales over this period.

Improvements Suggested

Following are some suggestions for mechanical and other improvements that might be made on the above described process. Most of these suggestions are dependent upon the volume to be handled:

Sweet corn under the usual method of handling, without refrigeration, loses 60 percent of its sugar content through heating and conversion to starch the first 24 hours after harvesting. With the method described in this article the loss is cut to less than 5 percent in the same 24-hour period and to only about 15 percent in 72 hours.

1—Plantings should be planned so that harvest will be either early or late. There is a period of about one month starting shortly after August 1 in the middle west when there is a large amount of local or so-called "home-grown" corn available which tends to break the market.

2—There are a number of harvesting systems now in operation that will cut down on labor costs such as a conveyor that is kept immediately in front of all members of the harvest crew and saves the time spent in filling and emptying their containers.

3—A separate icing and packaging crew should be utilized when possible with the corn being taken to the processing location as rapidly as possible.

4—If tanks are used as in this project, some device such as a wire basket for lowering the corn into the coolant and lifting it out for packaging should be devised. Taking the corn out by hand is very unpleasant even on the hottest days.

5—A large tank with conveyor and a means of keeping the water in circulation would be most desirable. The conveyor speed would be so regulated that the corn would be in the coolant the length of time necessary to bring it to the lowest economical temperature.

6—Cartage costs per bag would be materially reduced by maximum loads. Costs on this project ran exceptionally high—almost 3 cents per dozen ears.

In planning a project along the above lines, the following points are important:

1—Have an assured outlet for the acreage planned and be sure that this outlet is able and willing to handle the product properly.

2—Be certain that the paper bags are available and order early. If necessary the ordinary bags in which crushed and cube ice are sold may be used. However, they hold only 4 dozen and are only two thicknesses.

3—Have it agreed with the grower or growers that nothing but quality will be marketed and that an official inspection will be the deciding element in case of question.

4—Get the plant set up early and plan the location so that the ice supply will be easily available. With a large volume, an icehouse and crusher are desirable.

Fair Cost Figure

Considering these differences, the fact that the costs were so nearly the same on the two projects would indicate that this could be taken as a fair cost figure on a small volume project.

A colored movie film was made covering the various steps from field to the consumer's table and will be made available to interested groups, agriculture classes, etc., in Illinois.

COSTS AND RETURNS ON ILLINOIS CORN ICING PROJECT

	Per Dozen		*Per 5 Dozen Bag*	
	W. Frankfort	*Anna*	*W. Frankfort*	*Anna*
Labor—harvesting and processing[1]	$.0980	$.1158	$.4900	$.5791
Bag	.0223	.0223	.1116	.1116
Ice[2]	.0223	.0299	.1112	.1494
Hauling	.0263	.0296	.1316	.1480
Total Costs	.1689	.1976	.8444	.9881
Average sales price[3]	.3789	.4244	1.8945	2.1218
Net to grower	.2100	.2268	1.0501	1.1337
Volume covered by above figures	1900 doz.	3155 doz.	380 bags	631 bags

[1]The West Frankfort project had a better stand of corn and with their later planting and more even growing temperatures were able in most instances to gather all the corn the first time over. These facts account for the difference in labor costs. Labor scale was identical.

[2]The difference in ice costs was caused by an adjustment made by the West Frankfort Ice Company at the close of the season as a contribution to the project. Had the same ice price prevailed, the West Frankfort cost per bag would have been $.0231 more than the Anna cost since they used 8.6 pounds more per bag at West Frankfort. This additional ice was necessitated by some re-icing and higher temperatures at the time of their harvest.

[3]Although the general quality and freedom from worms were better at West Frankfort than at Anna, the West Frankfort harvest hit the August market slump and some of their corn sales were at $1.25 per bag as against a low of $2.00 at Anna.

There is a definite demand for precooled and package iced sweet corn and this demand will increase as the consuming public becomes aware that this quality can be made available.

Present indications are that there will be a number of projects similar to the 1951 project throughout Illinois in 1952. In a number of cases, these projects will be initiated by the ice industry who see in them an opportunity to increase their ice tonnage both through the processing and at the retail display.

In addition to the growers who cooperated in this project, the following are gratefully acknowledged as cooperators with the Division of Markets, Illinois Department of Agriculture: Cape Chemical Co., Cape Girardeau, Mo.; Illinois Association of Ice Industries; Illinois Central Railroad; Illinois Chain Store Council; Kroger Company; National Association of Ice Industries; Public Ice Service Company, Anna, Ill.; Radio Station WFRX, West Frankfort, Ill.; Southern Illinois University; The Great Atlantic & Pacific Tea Co.; Union Bag & Paper Corp.; Union County (Illinois) Farm Bureau; Union County Implement Co., Anna, Ill.; W. Frankfort Chamber of Commerce, W. Frankfort, Ill.; W. Frankfort Ice Co., W. Frankfort, Ill.

Patent Office Grants Reissue of Orrison Ice Sizing Patent

A RE-ISSUE of the Orrison "ice-sizing" patent, was granted by the United States patent office December 25, 1951. This patent was originally applied for April 14, 1938 and granted May 24, 1938. The original patent, following litigation by the ice industry, was declared invalid by the U. S. District Courts in Baltimore and Dallas and also the Fourth Circuit Court of Appeals.

The reissue patent (R E 23,446) abandons seven of the claims made in the original patent but retains revised versions of claims 1 and 7 and in addition, four new claims are granted. A similar Canadian patent, which is still untested in the courts, remains unaffected.

The two revised claims and the four new claims are as follows:

1. As an article of manufacture, a free-flowing mass of ice in bulk form produced by freezing a body of water, removing water during the latter part of the freezing that would otherwise form into a cloudy core, adding fresh water to replace that removed and finishing the freezing, crushing the ice into lumps and then screening to produce discrete solid transparent pieces free from snow, the screening being one which places the ice lumps in a seething state of agitation which shakes the lumps and rubs them against each other and against the surface of the screen causing any snow that is adhering to the pieces of ice to be separated therefrom, the sharp edges of the pieces produced by crushing being rounded by abrasion from the screening motion.

7. The method of making a free-flowing mass of ice comprising crushing a transparent block of ice thereby producing a mixture of pieces of ice of various sizes including snow, subjecting the mixture to a seething state of agitation through a vibrating screening motion of high frequency and low amplitude to separate the mixture into one portion that contains the snow and into another portion that consists of free-flowing crystal-clear discrete lumps free from snow, and carrying out the screening operation at a temperature where there will be no substantial melting of the ice."

10. The method of claim 7 in which the transparent block is produced by freezing a body of water and during the latter part of the freezing removing water that would otherwise form into a cloudy core, replacing the water with fresh water and finishing the freezing of the block.

11. The method of claim 10 in which any cloudy ice on the top part of the block is sawed off before crushing so that the resultant block fed to the crusher is all transparent ice.

12. The method of claim 1 in which any cloudy ice at the end of the block is sawed off so that the block is all transparent before it is crushed.

13. As an article of manufacture, a free-flowing mass of ice in bulk form produced by crushing transparent ice into lumps and then screening to produce discrete solid transparent pieces free from snow, the screening being one which places the ice lumps into a seething state of agitation which shakes the lumps and rubs them against each other and against the surface of the screen causing any snow that is adhering to the pieces of ice to be separated therefrom, the sharp edges of the pieces produced by crushing being rounded by abrasion from the screening motion.

Shortages Loom in Steel Copper and Aluminum

ATTENTION to critical shortages of steel, copper and aluminum has been directed by the United States Department of Agriculture, the ice industry's claimant agency for materials for construction.

Shortages of these materials have resulted in substantial delay between approval of warranted projects and delivery of materials. This situation, of course, makes it imperative for applicants to plan ahead several months if priority assistance is required. CMP-4c applications (for construction) which are destined for handling by the Department of Agriculture should be filed at least three months prior to the beginning of the quarter in which the materials are needed.

Canadian Ice Company Presents Radio Program

EVERY morning at 8:45 a.m. over radio station CJBC, Lake Simcoe Ice & Fuel Ltd., Ontario, Canada, goes on the air with a program of music and announcements promoting the advantages of ice and ice refrigeration. The program is designed primarily to publicize the superiority of ice as a refrigerant, and as the season or condition indicates the company's various ice services and ice products are featured. CJBC is one of the most powerful Canadian stations and is clearly received in most parts of central, western and eastern Ontario.

Michigan Ice Industries Association

EDWARD JACKSON, Secretary

THE thirty-fifth annual convention of the Michigan Ice Industries Association will again be held at the Detroit-Leland Hotel, Detroit, Michigan on February 12 and 13, 1952. The arrangements for the program are not complete at this date, but we can report that the business sessions will be loaded with interesting and valuable information covering the operation of ice plants, and how to increase sales and profits.

Florida Ice Association Merchandising Meeting

A one-day merchandising meeting will be held by the Florida Ice Association February 14 at Jacksonville, Fla. The meeting will start at 3 p.m. All ice plant operators, superintendents, salesmen and route men are invited. The program will include an address by Dr. Frank Goodwin who spoke on "The Pot of Gold" at the Florida convention.

Four New Compressors Provide Refrigeration For Large Industrial Textile Plant

THE refrigeration system operated by the Celanese Corporation of America at Amcelle, Md., is one of the largest industrial installations now in service, with a total capacity of over 10,000 tons. In 1951 four Frick enclosed ammonia compressors each having four cylinders of 14-inch bore and 12-inch stroke were installed.

The new machines can be operated at suction pressures averaging either 20, 45 or 60 lb. gage. These pressures are plainly lettered alongside the valves on the special manifold placed above the driving motors. The control board is complete with recording thermometers and automatic devices for opening and closing the compressor clearance pockets, as necessary to balance the load within a fraction of a degree.

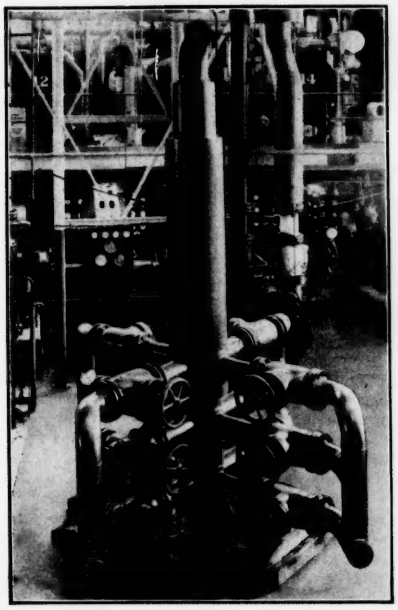
In 1929 the company installed six big Type-J Frick horizontal ammonia compressors and in 1933 two more were added. Most of these are 12¼ by 20 by 21 inch machines, having duplex cylinders arranged for two-stage operation; each cylinder is equipped with capacity controls. The motors are 500 hp and turn at 180 rpm. Five Frick enclosed ammonia compressors were later put in service at the plant. The equipment chills brine within very close limits in a battery of huge shell-and-tube coolers, each 68 inches in diameter. A row of type-VS condensers stands outside the machine room, which is one of the largest of its kind in the country.

Two of the big vertical compressors are connected through flexible couplings to a synchronous motor placed between them. Each motor is of 1250 horsepower, and operates at 327 rpm. The couplings were made by the Thomas Flexible Coupling Company and the motors by Ideal Electric Company. The compressors are equipped with automatic capacity controls. The large vertical compressors will be connected to the special headers illustrated, which permit each machine to carry any one of three suction pressures. Along with the new machines, Frick Company furnished another condenser and another 68 in. by 18 ft. water cooler, which is fitted with 1742 tubes of 1 in. size.

The enormous load is divided between the cooling of brine and of water, and is carried at four temperature levels: very cold brine at -15F; brine at 25F; water at 40 and water at 45F. The water at 45 is used for air conditioning, this part of the load being nearly 4000 tons.

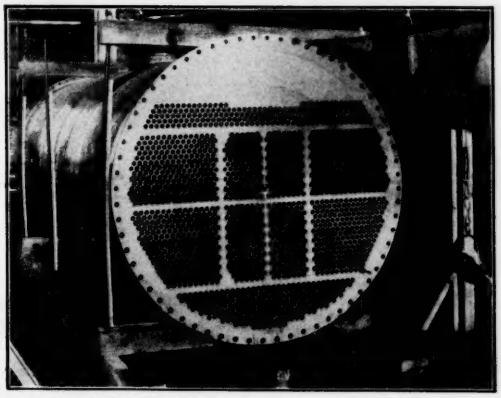
The air conditioning is handled by the Frick compressors in summer weather with a motor input horsepower per ton of refrigeration as low as 0.70. Engineers who have wrestled with other types of refrigerating machines, requiring from 1.0 to 1.25 or more horsepower per ton of refrigeration on similar work, will appreciate the big savings made here.

H. C. Givens, Jr., is manager of the plant, which is one of twelve operated by the Celanese Corporation. W. J. Elvin is plant engineer. The refrigerating engineer for the Amcelle plant is Ralph I. Alexander, who has been with the company for nearly a quarter of a century. He has had much to do with the development of the refrigerating system at Amcelle. Mr. Alexander is a graduate in engineering of the University of Rhode Island, at Kingston, and for several years taught engineering. Under his direction the plant is operated on a highly efficient schedule, as evidenced by the log sheets, which would be the pride of many a test engineer.



Left: This manifold, to be mounted above the new vertical compressors at the Celanese plant, will permit any machine to carry either of three pressures. The vertical main is made up of three concentric pipes of different diameters in which the center pipe and the two annular spaces carry the three different pressures.

Below: This 68-inch brine cooler with 1742 tubes, will be added to the bank of similar shells at the Celanese plant.



Reports from Unit Ice Associations

Illinois Association of Ice Industries

WM. D. WRIGHT, Secretary

THE ice business generally in Illinois was not good in 1951. Only in isolated cases, especially where existing plants had acquired new properties, was there increase in tonnage. Also, defense projects in some localities furnished new business. Of course the net profit is the most important figure. In some cases, because of bettered price structure the dollar value showed improvement. Costs keep creeping up and to offset that, some things have been done to effect economies, changes in distribution methods, close appraisal of expenses and a paring down and elimination of same wherever possible. This is a must and old methods, systems and extravagances must be continually revised . . . and altered.

Processed Sales Grow

Processed ice sales continue to show improvement, depending on the effort made to acquaint the merchants and others of the benefits to be derived from its numerous applications. Merchandising has reached an all time low as applied to ice using equipment and generally I think the same might be said of the promotion of ice sales. Merchandising has always been the weak link in the industry and is the one spot that needs most attention.

Vending machines are receiving good reception. There are many good things to be said in their favor. They also present some problems. Certainly they cannot be looked upon as a cure-all for all the distribution ills of the industry. They have their place in the program and I feel that when the price reaches a level that mass acceptance may be had and the mechanical defects are cured they will attain greater acceptance.

Ice men are notoriously poor advertisers. The value and need for a consistent and intelligent advertising effort has long since passed the debatable stage. Only in spots has there been any advertising effort worthy of the name. With the discontinuance of the National program of publicity and the barreness of local advertising, a situation is created that certainly is not good for the future outlook. That old adage "If they are going to be sold they've got to be told" is still true and in addition, management must be sales minded, someone in the organization must be trained and charged with the responsibility of selling, full time and then the quality of product and service must live up to all claims made. All this is elementary as has been proven with every product or service that has gone places and still enjoys popularity. We all wish and hope that ice enjoyed this popularity and acceptance. Unfortunately, at the present time, it does not, and probably will not until management makes the necessary effort to bring it about.

We know that we are attempting to do business under the most adverse conditions, a cock-eyed economy, inflation, controls, prohibitions, scarcities of materials, and labor that is both scarce and inefficient and uncooperative, a tax burden that is oppressive and confiscatory. We know that it is becoming increasingly difficult for small plants in any industry, whose total sales are low, to stay in business. We have ample proof of that in many instances of closures, sales to larger groups in the same business, cessation of manufacturing and turn to the role of distributor only.

It is not a healthy sign and certainly not in keeping with our philosophy of free enterprise and individual initiative and unless we become alarmed enough to do something about it at the fountain head, I have a firm conviction that we are going to be sold down the river.

I think the factors enumerated above are the determining factors in our future state of business and will govern the results in 1952 as well as future years so long as we are in a garrison state and so long as we have leaders who place personal, political interest ahead of public interest, statesmanship and old fashioned common sense and common honesty.

Missouri and Kansas Ice Associations Hold Joint Annual Meeting

A VERY successful joint convention of the Missouri Valley Ice Manufacturers' Association and the Kansas Association of Ice Industries was held at the Hotel President, Kansas City, Mo., January 7 to 9. The convention was opened Monday afternoon by J. R. Dean, Missouri Valley president.

Virgil Conkling. Chief, Food and Restaurant Division of the Office of Price Stabilization, Kansas City, explained the OPS regulations as they apply to the ice industry.

Walter W. King, regional director Wage and Hour and Public Contracts Division United States Dept. of Labor, Kansas City, gave a detailed explanation of the wage stabilization orders that have been issued.

The second session was opened Tuesday morning by N. E. Vandyne, Kansas president.

Ted L. Joule, Extension Economist in Marketing, University of Missouri, Columbia, Mo., told of the project that was to be started in Missouri the week of January 14. This project will consist of holding iced poultry display meetings in the various towns and cities throughout the state. The Missouri Valley Ice Manufacturers Association has purchased an iced poultry display case to be used by Mr. Joule for these meetings.

Richard C. Muckerman, Executive Vice-President, City Products Corp., St. Louis, Mo., gave a detailed outline of the results of the meat icing project conducted by the University of California. During his talk slides were shown to illustrate the good results obtained by the market operators with the meat on ice method. He urged every company, large and small, to get this program under way in their respective towns.

L. L. McCoy, Chief Engineer, City Products Corporation, St. Louis, discussed various ways and means to cut costs in operation. He also urged all plant operators to be safety minded since accidents are becoming more and more costly.

The luncheon speaker, George H. Charno, Sr., special assistant to the United States Attorney, Kansas City, Mo., gave a very interesting and entertaining talk titled "Do People Need Icing."

The final session was opened by Harold Margolin, Missouri Valley vice-president.

Morris Shlensky, vice-president and general manager, Katz Drug Company, Kansas City, gave a most interesting talk on merchandising, in which he described the merchandising operations of the Katz Drug Company.

Guy W. Jacobs, Executive Secretary of the National Association of Ice Industries told of the operation of the National Association and the work they are doing at the National office to help the icemen in the United States, both with the government agencies and through cooperation with other industries to promote the use of ice such as poultry, meat, etc.

The annual banquet and floor show was held Tuesday evening, January 8, in the Ballroom of the President Hotel. Each lady present was presented with a three orchid corsage. The floor show, arranged by Entertainment Chairman Harold Margolin, consisted of seven outstanding acts. Music before and during dinner was furnished by The Strollers, a three piece string band. After the show there was dancing with music furnished by a six piece band.

Missouri Valley Officers

Officers for the Missouri Valley Association were re-elected as follows:

President, J. R. Dean, Cape Girardeau, Mo.

Vice-president, Harold Margolin, Kansas City, Mo.

Secretary-treasurer, V. A. Esphorst, St. Louis, Mo.

Directors: M. J. Garvey, Jr., St. Joseph, Mo.; Alvin D. Hatten, Independence, Mo.; Richard C. Muckerman, St. Louis, Mo.

Kansas Officers

The Kansas Association of Ice Industries elected the following officers:

President, E. J. Hund, Beloit, Kans.

Vice-president, Tom Carroll, Wichita, Kans.

Secretary, Matt Scherer, McPherson, Kans.

Directors: C. N. Van Dune, Parsons; H. H. Bettis, Pratt; Paul Hoffman, Abilene; R. L. Garrison, Ellis.

Ohio Association of Ice Industries

ELIZABETH SHANNON, Acting Secy.

PLANS for the annual convention of the Ohio Association of Ice Industries are virtually complete, and those who come to the Deshler-Wallick Hotel in Columbus February 24, 25 and 26, are guaranteed a tonnage-building trip—with a healthy side order of pleasure.

Full program details will be furnished later, but we can report that the three business sessions (two Monday, one Tuesday) will be built around the merchandising phase of the ice business. Among other topics will be brass-tacks explanations of how to sell sweet-corn icing and meat-on-ice, both of which National Association research has now proved thoroughly practical.

The convention will actually start, as usual, with the preliminary "Get-acquainted" party Sunday evening. Both this party and the business sessions will be held this year in a different, more suitable sector of the hotel. From the rear building (the Wallick) we are moving forward to the main, or Deshler building—specifically to parlors A, B and C on the second floor. These three parlors together form a single room which will accommodate our group much more compactly than the Hall of Mirrors, formerly used. Exhibits will be set up in Rooms 216 and 218.

The traditional Dinner Party Monday evening will undergo a similar change in locale. It will take place in the beautiful Crystal Ballroom, which is also on the second floor in the Deshler building. It is thought that this room, too, will be more apropos than the Hall of Mirrors, and will provide the setting for a friendlier, better integrated party.

Ice Man Is Honored for Long Service

WHEN Ward J. Motz had rounded out 50 years with the Klages Coal & Ice Co., Akron, Ohio, and still on the job, the company celebrated with a party and presented him with a new easy chair. But he says he doesn't intend to spend too much time in it because he expects to keep right on working at the plant as a stationary engineer and taking care of Iceland Arena.

Mr. Motz can remember when the president of the company, L. A. Klages, was his assistant. This unusual event occurred when he was engineer at the old Klages power plant years ago and L. A. Klages, now president of the company, was his helper. Mr. Klages was learning the business and was assigned as a youth by his father, Henry, to work with Mr. Motz.

Mr. Motz started with Klages in 1901. At the time this was the only ice manufacturing plant in that section of the country. His first job was a driver of a one-horse coal wagon. He delivered coal then at 500 pounds for $1 and it is now around $15 a ton.

Later, he was given an ice route in East Akron, then known as Middlebury. But he had an ambition to be a stationary engineer. Therefore, he was transferred back to the plant at Summit and Bluff as an oiler. Machinery to manufacture ice at that time was steam driven. He studied engineering by correspondence and eventually passed the state examination and holds a first class rating he got 38 years ago.

Natural Ice Days

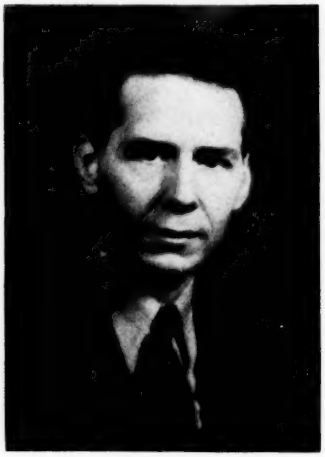
He recalls the days when ice was harvested from Summit Lake when great enough supplies could not be manufactured. Ice houses were used to store the ice. Canal boats brought ice from the lake to Main and Exchange Streets at Lock 1.

Mr. Motz has been married 40 years, has six children—four daughters and two sons—all married. His hobbies are vegetable gardening and fishing.

Ward J. Motz has a new easy chair for himself after working for the Klages Coal & Ice Co., Akron, Ohio for 50 years. The chair was presented at a party in his honor by L. A. Klages (center) president, and W. B. Blessman, vice-president.

Emerson Andre Brandt

THE death of Emerson A. Brandt, technical editor of ICE AND REFRIGERATION and secretary of the National Association of Practical Refrigerating Engineers occurred Friday evening January 18 at St. Anne's Hospital, Chicago. Mr. Brandt suffered a cerebral hemorrhage shortly before noon Friday at his office and never regained consciousness. Up to that time he had been in his usual good health, and had had no warning of the sudden attack. He was 48 years old.



Emerson A. Brandt

Mr. Brandt was well known throughout the refrigerating industries. A graduate of the mechanical engineering school of Purdue University, class of 1925, B.S. degree, he was awarded a professional M.E. degree in 1929. In 1925 he accepted a position with the Kentucky Utilities Co. of Louisville. From 1928 to 1932 he was with the ice manufacturing department of Middle West Utilities. In 1932 he was appointed secretary of the Technical Department of the National Association of Ice Industries, and in 1934 he assumed, in addition, the duties of secretary of the National Association Practical Refrigerating Engineers.

In January, 1943, he became Technical Editor of ICE AND REFRIGERATION, moving at the time with his family from Washington to Chicago, and continuing as secretary of N.A.P.R.E. At the time of joining the staff of Nickerson & Collins Co., publishers of ICE AND REFRIGERATION, he purchased a residence in Glen Ellyn, where he had made his home since that time.

By education and practical experience, Mr. Brandt was thoroughly familiar with the operation and construction details of ice making and other refrigerating plants in all their phases. He has written a number of technical articles on ice making, air conditioning, safety, and other phases of refrigeration for ICE AND REFRIGERATION and other publications. With A. J. Authenreith he was co-author of "Practical Ice Making," published some years ago by Nickerson & Collins Co. In his connection with ICE AND REFRIGERATION he has provided invaluable service through editorial supervision of technical and mechanical articles, many of which he wrote, also in providing information to correspondents on technical and practical operating aspects of refrigerating plants.

He was a member of the American Society of Refrigerating Engineers and of the First Congregational church, Glen Ellyn. He had served as a member of the School Board of Glen Ellyn and helped organize the Sunday Evening Club of Glen Ellyn, of which he served for a time as managing director. At Purdue he was a member of the Alpha Tau Omega Fraternity.

His sudden and unexpected passing came as a great shock, particularly to his office associates and to the official board of N.A.P.R.E. His knowledge of refrigerating engineering, as well as his wide acquaintance among members of the fields covered by ICE AND REFRIGERATION provided an invaluable service, which will be difficult, if not impossible, to replace. We of his office associates especially will miss his presence, his sincerity, his even temperament, his friendly disposition, and his help and advice which was always available.

He leaves his widow, Mrs. Mary Brandt, a daughter Carol, 14, his mother, Mrs. Viola Emerson Brandt, Louisville, Ky., and a brother Fred Brandt, Nashville, Tenn.

Ice Plant Abandoned

THE municipally owned ice manufacturing plant at Paris, Mo., may soon be closed permanently because it is no longer a profitable enterprise to operate, Mayor Guy Reed said recently. For many years this ice plant was one of the most profitable enterprises engaged in by the city, which also owns its own light and water plant. However, the demand for ice has decreased gradually in the last few years until a tally of the last twelve months' business shows it has barely broken even. Ice customers will be supplied from a neighboring town.

Crushed Ice for Burns

APPLICATION of crushed ice packs is effective in the treatment of burns. This was proved in fifty cases of most severe burns aboard a Navy vessel. The ship's surgeon, Dr. Shephen E. Flynn of Coronado, Calif., ran short of medical and surgical supplies generally used in such cases. He simply applied crushed ice packs to the sites of burns. Immediate relief of pain and shock followed. Healing without infection was speeded up.

"Crushed ice was superior to morphine sulfate in relieving the pain of burns," Dr. Flynn has reported. Its effectiveness is due to the chilling effect. Even putting your burned fingers under running cold water helps a little. But if the burns are severe, ice packs should be kept on them for two or three days. Sterilized petrolatum gauze dressing, sealed in foils, is now available for use on mild burns, after the chilling treatment.

Canadian Ice Advertising

A FULL color double spread editorial feature on ice punch bowls appears in the December issue of the Chatelaine Magazine entitled "Holiday Hospitality." The circulation of the December issue of Chatelaine was well over 300,000 copies.

More good publicity for ice appeared in the Globe and Mail, Toronto, December 20 issue, in the special women's feature, "Today's Food" by Ann Adam. The article starts out, "What about extra ice, if you are on hospitality bent? Do you know all the forms in which you can order it, such as cubed, crushed, and all packed in handy waterproof containers?" The article goes on to talk about ice vending machines, and ice punch bowls. Dealers in Western and Eastern Ontario are especially interested in this as the Globe and Mail has a heavy circulation throughout these areas.

Ice Men in Fatal Auto Accident

INJURIES received in a head-on collision of the car he was driving with a truck caused the death of Herbert I. Morris, 36 year old route superintendent of New State Ice Co., Oklahoma City, Okla. Laurence Volkers, 62, vice-president and general manager of the company, injured in the same accident, was reported recovering at St. Anthony's hospital from a fractured left hip, several broken ribs, glass cuts on his face and numerous bruises.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Regis Gubser, Los Angeles, Calif.
Chairman Board of Directors
National Association of
Practical Refrigerating Engineers

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How User of Refrigerating Equipment Can Get the Most for His Money

HOWARD O. JACKSON
Purchasing Agent,
Swift & Co., Chicago

A purchasing agent for one of the large packing companies, Mr. Jackson gives suggestions on methods which will procure the best value for the user when he buys refrigeration and allied equipment.

WHETHER we consider this subject in the broader sense, or as the owner and user of refrigerating machinery and equipment, makes little difference basically—but I shall try to answer this question as a user of refrigerating machinery and equipment.

Basically there are three considerations we will attempt to touch on. In the first place, before one becomes an owner or user, he must make careful selection of the type of equipment best suited to do a given job. Secondly, after this selection or basic specifications have been established, he must then attempt to purchase as economically as possible. And last, after the purchase has been made and the equipment delivered, the equipment must be applied and used as carefully as possible with necessary provisions made for maintenance and operation.

Selection Integrated With Function

As a buyer of such equipment for Swift & Company, I believe it best to dwell primarily on the first two points just mentioned. As a matter of fact, we consider the first two functions as being more or less integral parts of buying. In other words, the selection of equipment and the laying down of basic and complete specifications should be carefully integrated with the actual buying function which embraces prices, deliveries, adjustments and payments. Therefore, this first consideration means that there must be close relationship and cooperation between engineering and operating departments and the buyer in the purchasing end of the business.

Presented to Chicago Chapter, NAPRE.

Fully Informed

It also means that the buyer should make every attempt to get well acquainted with the various types of equipment available and the functions and operations of them. One of the best ways in which the buyer can become acquainted with these and keep posted on latest developments and changes is through close relationship between the buyer and the manufacturer or seller. We, at Swift, feel that this relationship cannot be over-emphasized and that it is one of the primary requisites to good buying.

Quality and Service

Naturally, we attempt to establish these contacts only with reputable and dependable concerns, for beyond price we think that it is very necessary that quality and service come first. You know very well that there are some concerns who do a first class selling job which ends rather abruptly upon delivery of equipment. This may be their interpretation of a good selling job—but not ours. The factors of quality and service must be sold along with the product, and it is to that type of selling which a company such as ours responds.

The first premise that I believe necessary is for the sales representative to understand, and fully appreciate the requirements of Swift &

Company in connection with a particular piece of equipment or product; similarly for me to consider the interests of his company. In order for us to obtain this necessary understanding we must have honesty—fair play—respect. Each of us has equal responsibility. For each to do a good job he must have—

1. Reputation for reliability;
2. Progressiveness and fair play.

Both of these virtues contribute to creating good trade relations.

So far we have discussed, as essentials for one to get the most for his money, a mutuality in our understanding as to the methods—aims—desires. If we sincerely approach our mutual problems with honesty, fair play and respect, then both buyer and seller should make a profit.

Basic Factors

Again I would like to enumerate what we as users buy when obtaining machinery and equipment—

1—Quality;
2—Service;
3—Cost.

Can the seller offer us any other item that would not fall within these three basic considerations? None of these basic considerations has any priority over the other and everything that he has to sell or anything that we have to buy will fall within one or all of these categories.

Now the equipment salesman may ask, "What do I have to do to get these points across?" I believe that it is essential for him to give careful attention to the following:

1—Find out what our problems are.

2—Determine for himself how we have met these problems in the past.

3—Diplomatically correct our errors in evaluating our problems.

4—Present a clear, concise, intelligent report in his proposal on equipment of adequate specifications to take care of our needs.

5—Outline to us in sufficient detail advantages and disadvantages, if any, of the equipment which is offered for our consideration.

Although my remarks regarding this important subject are very brief the problem is basically as stated. If we approach this problem with mutual understanding, honesty, fair play and respect and the seller presents his proposal in that light and we, when analyzing your proposal, accept it in a like manner, then the user of machinery and equipment will get the most for his money and will be well satisfied with the job done.

The Manufacturer Recommends

WILLIAM BODINUS
District Manager
Carrier Corporation, Chicago

In this second section of the discussion of how the user of refrigerating equipment can get the most for his money, the views of the equipment manufacturer and installer are given by William Bodinus. He agrees in general with the analysis of the problem by Mr. Jackson and adds a number of detailed considerations to guide the purchaser and user of equipment to the best and most satisfactory job.

WE ARE gathered to discuss the age-old problem of "How to get the best job for the owner" specifically pointed to the industry in which most of us make our living. Although my assignment in this program is that of representing a manufacturer of refrigeration and air conditioning equipment, I believe it would be appropriate to review, or rather outline the physical processes which go toward making the complete refrigeration or air conditioning system and which materially affect the actual performance of the manufactured equipment and the degree of satisfaction enjoyed by the owner.

A refrigeration or air conditioning installation follows a more or less routine pattern once the decision is made that a refrigeration system shall be installed either for industrial process or comfort cooling. The preliminaries to the selection of the organization to make the installation are:

(a) An analysis of the problem.
(b) A preliminary layout.
(c) Cost estimate.
(d) Owning and operating cost budget.
(e) Contract for installation.

Obviously the above procedure could be followed through in one of several ways and often this preparatory information is generally prepared by a consulting engineer.

The contract for the installation is probably the most important step in all of the details which go together in making a refrigerating or air conditioning system, and in selecting the organization to be given this responsibility, some of the requirements to look at are:

Does He Have:

(a) A sales engineering department to act as a liaison between the several contracting parties and his own organization.

(b) A contract engineering department for the preparation of bills of material and installation drawings.

(c) A construction department to requisition factory manufactured equipment, purchase components, award sub-contracts, provide for installation labor according to established union practices, and to furnish supervision to coordinate and complete the installation in accordance with the contract requirements and to the satisfaction of the owner.

(d) A service department to start up the installation, place it in operation, balance and adjust same, prepare operating instructions, and instruct the owner's engineer in the proper operation of the system.

(e) An accounting department to provide for regular invoicing for labor and materials furnished, arrange for final payment, issue waivers of lien, contractor's affidavits, and to fix the dates for warranties.

Selection of Equipment Is Important

The selection of the manufactured equipment which is one of the functions of the foregoing is, of course, of paramount importance to the owner as well as the manufacturer. It is a well-known fact that the manufacturer's name on the refrigeration equipment or air handling apparatus is one of the permanent parts of the installation. The owner considers these components the heart of his installation, and generally looks to the manufacturer for guidance and advice on the continued performance of

the system as well as he does with the contractor and engineers who made the installation and designed the job.

Essentials

In selecting the manufacturer of equipment, there is one essential consideration which I am sure that all of us realize and which becomes more important in the Atomic Age in which we are now living; this is that no man or organization can be master of all things. Many individuals can do a number of things well, but the true craftsman is always found in a concentrated particular field of endeavor. This is true in almost every scientific development, and is behind every masterpiece of art or literature. Industrial accomplishments are great because there is a singleness of purpose, a single ideal, "one furrow and one faith."

The air conditioning and refrigeration equipment business is an industry in itself which requires staffs of engineers and development scientists the extent of which few people realize. It is, therefore, advisable to look beyond the physical construction of a compressor, condenser, unit cooler, or air conditioning apparatus and see what has created the specific design of the equipment. Then after the installation is made, it is reassuring for the customer to look beyond and have confidence that the manufacturer of the equipment he has installed will be in the refrigeration business years from now.

If low cost is most important, then there could be the added risk of having an orphan after a few years of operation with its resulting consequences. A wise buyer should be careful lest he purchase equipment from one who is today enthusiastic about the business, but when the field becomes less lucrative, he loses interest quickly and directs his activity towards new fields.

Another point in selecting the right manufactured equipment is to know the attitude of the manufacturer with respect to service, warranties, sustained interest in the owner's welfare and whether he is really concerned about the continued satisfaction in the use of the system and equipment.

Last and not least, of course, is the precision workmanship of the individual pieces of equipment, the fineness of the machined parts, the use of the most advanced machine designs, the ease of service and replacement, and the efficiency of operation. Coupled with this is the balanced selection of the components as they fit one another. Are the compressor, condenser, evaporator, interconnecting piping, and handling air equipment all designed to work together?

These are some of the things that go toward getting the best job for the owner. I would like to repeat one point I made in the beginning—no matter how fine the manufacture of a compressor or weathermaker, if the design of the system and the installation of the equipment are not in competent hands, that fine piece of equipment cannot long function efficiently.

N A P R E
Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

Freezing Popsicles

Question No. 907: We are setting up a section of the plant to freeze popsicles at the rate of 600 dozen per hour. They will be 2¼ in. wide, ⅞ in. thick and weigh 3½ ozs. The common formula for ice freezing time does not apply, apparently because of small thickness and low temperature. What I would like to know is the freezing time for these popsicles with brine at -20 F. In stating the freezing time please give the brine circulating velocity required to produce these results.—T.J.M.

ANSWER: One of our local ice cream plants has recently installed a tank for freezing popsicles, which was furnished by the Joe Lowe Corp. The tank is about 15 ft. long inside and contains 36 molds, 24 pieces per mold, arranged 4 wide by 9 long.

The Lowe Corp. reports that the tank will produce about 6 pulls per hour with brine -20F. The freezing time then is 60/6 or 10 minutes and the rated output is

6 x 36 x 2 = 432 dozen per hr.

No information was obtainable on the velocity of the brine circulation around the molds. Bert McKenna reports that a popsicle tank he measured in San Francisco had a brine velocity of 15 feet per minute when measured with no molds in place. The actual brine velocity when the molds are in place would then depend upon the clearance between the molds, because circulation underneath is usually held to a minimum. —H. G. Venemann.

NAPRE Department

Commutator Undercutting

Question No. 908: What is the current practice in the maintenance of commutators on small motors? Sometimes the segments of insulation separating the commutator bars appear to require undercutting to produce good operation. In some cases, however, the brushes do not wear at all well when the commutator is undercut. I would appreciate your comments and suggestions on the best procedure.—R.L.I.

ANSWER: Our motor service department has hundreds of motors to maintain. They have an undercutting machine that is kept busy most of the time undercutting the mica from some commutator so as to keep the brushes from wearing. When undercutting is necessary the commutators are also turned in order to give the brush a true surface to work on.

Care must be taken to insure that the undercutting is not overdone, and also that none of the copper is cut away on the sides. In other words the gap should be no wider than that caused by the insulator. Then the brush should be of proper hardness and the spring tension just enough to insure good contact. Our service superintendent does not know of any substitute for undercutting when the brushes contact the mica. — H. G. Venemann.

Suction Trap Size

Question No. 909: At the convention there was a question about how to size accumulators or suction traps so that they would positively separate the liquid ammonia carried with the suction gas. We were told that all liquid will drop out when the gas velocity through the trap is less than 200 ft. per minute. Apparently it is quite important to reduce the gas velocity to a sufficiently low figure if positive separation of the liquid and gas is to be obtained in the trap.

Will you please demonstrate how this calculation is made? For instance will you calculate the dimensions of a trap for a 20 ton load where the ammonia suction pressure is 3 pounds gage.—C.G.N.

ANSWER: In order to obtain a specified velocity for any fluid passing through a cross-sectional area it is necessary to know the volume of the fluid flowing per minute and the dimensions of the cross-sectional area. This results in a very commonly used equation:

The Ice Industry

$$Q = A V$$

Q is volume flowing in cu. ft. per min.

A is the cross-sectional area in sq. ft.

V is the velocity in ft. per min. (200 fpm.)

We will assume a condensing temperature of 90F. (166 psig). Then the heat in the liquid at 90F. is 143.5 Btu per lb. The heat in the suction gas at 3 psig is 604.6 Btu per lb., neglecting superheat. The refrigerating effect is the difference between the heat carried to the evaporator in the liquid and the heat carried out in the suction gas. In this case the refrigerating effect is:

604.6 — 143.5 = 461.1 Btu per lb.

The 20 ton load at 200 Btu per ton per minute requires the following weight of ammonia per minute:

20 x 200/461.1 = 8.7 lb.

The volume of gas is about 16 cu. ft. per lb., making a total volume Q, of 139.2 cu. ft. per minute through the suction trap.

The cross-sectional area, A, would therefore be 139.2/200 or .696 sq. ft. This is about 100 sq. inches.

If a single pass vertical shell is used the inside diameter would be about 11.3 inches.

If a two-pass vertical shell is used, one with a baffle running downward through the center, then the cross-sectional area on each side of the baffle would have to be 100 sq. inches, thus requiring a 16 inch diameter shell. If a horizontal shell is used of the single pass type the cross-sectional area above the liquid line would have to be 100 sq. in.

If coils are installed within the accumulator for precooling the liquid, then the cross-sectional area for the gas flow must be increased a little to allow for the cross-sectional area of the coil.

The length of the vessel should be sufficient to allow time enough for separation to take place. It is usually from 3 to 6 times the diameter.

For a good practical design please refer to pages 37 and 38 of the 1944 Operating Data Book.

Robert Doremus suggests in this same data book that a suction trap without liquid coils for a plant 13-25 tons be 16 inch diameter and 4 feet long. If the trap is to include liquid coils he recommends a trap 16 inch diameter by 8 feet long for all sizes up to 20 tons. A trap with liquid coils must be made long enough to contain sufficient coil surface to accomplish the necessary heat transfer. —H. G. Venemann.

New Questions

Booster Added

Question No. 910: We are adding about 27 tons refrigeration at –28 F evaporator temperature to our plant load. I assume this added load should be carried on a booster compressor. At present we have two ammonia compressors in operation: a 10x10 at 280 rpm and an 8x8 at 300 rpm. They operate at about 20 psig suction and 175 psig discharge during periods of maximum demand and we figure the load they carry is about 65 tons refrigeration.

Can these two second stage compressors carry the added booster load mentioned above?—G.A.R.

Leak Warming for Brine Cooler

Question No. 911: We recently had a leak in one of our shell and tube brine coolers. They cool the brine to about –20 F with the ammonia suction pressure at about 3 inch vacuum. The leak thus allowed the calcium brine to be drawn into the ammonia system.

How could we arrange the system so that a leak would be quickly discovered before any troublesome amount of brine is drawn into the ammonia system? There is quite a large quantity of brine in this system which circulates from the coolers in the basement through refrigeration coils on a number of floors above. For this reason I do not believe a low level alarm on the brine in the balance tank on the roof would be practical. Your opinion on this point, too, would be appreciated.—C.T.S.

Condenser Leaks

Question No. 912: A leak in a condenser which allows the refrigerant to go into the cooling water would eventually be indicated by a shortage of refrigerant in the receiver. In a relatively simple system where the evaporator is close to the condenser and compressor and the load is rather steady, the liquid receiver level would probably be a satisfactory indicator of the tightness of the system.

In many plants the liquid level in the receiver varies from time to time so that this liquid level does not appear to me to be a sufficiently positive indicator of a refrigerant leak. By what other means would it be possible to keep track of conditions and obtain rather quick warning when a leak develops in the condenser and releases refrigerant into the cooling water.—C.T.S.

News Notes and Chapter Activities

Rio Grande Valley

By Armin Doneis

THE Rio Grande Valley Chapter is proceeding enthusiastically with the King Course in Refrigeration under the direction and guidance of Instructor John Muller who has so ably served in that capacity for the past four years.

A. M. Casberg brought us an enthusiastic report of the NAPRE Convention in Memphis and expressed his great satisfaction by calling it "one of our best!"

During our Question Periods we invariably get up a good discussion of some practical problem or other that has arisen on the job. At recent meetings the problem of reconditioning long-stem brine thermometers in which the liquid has separated was discussed. It was suggested that the bulb of such a thermometer could be dipped in very cold brine, or liquid ammonia, and the stem then jarred in a downward direction on a wooden block in short strokes until the fluid again makes an uninterrupted column. One member expressed surprise at the cost of having a thermometer of this type reconditioned by the manufacturer, until it was explained to him that the customary charge for such service usually ranges close to 90 percent of the cost of a new instrument.

Filtering of ammonia compressor oil came up for discussion and it was agreed that such oil never wears out and seldom becomes diluted or contaminated to such an extent that it cannot be thoroughly cleaned by passage through an oil filter. Such filtering, it was considered, made the oil as good as new, though there might be a possible slight change to a higher viscosity due to evaporation of the lighter "ends" of the oil. However, this change in viscosity is so slight as to have no practical significance.

At our meeting of December 4 our members benefitted from an interesting and informative talk by Mr. Elrod, sales manager of the Gulf Oil Co., who showed us two films dealing with lubrication. One film on Plain Bearing Lubrication showed the formation of the oil wedge and the resultant self-generated oil pressure inside a plain bearing, which tend to separate the metal surfaces. The second film described High Detergent oils and their use in internal combustion engines. In the ensuing discussion the use of oil filters arose, and Mr. Elrod explained that ordinary waste-packed filters would probably remove less of the detergent additive than the fullers-earth type. The terms viscosity, viscosity-index, and SAE numbers were explained, and a good deal of interest was apparent. Mr. Elrod's talk was well received.

Memphis

By Charles Conley

THE year was completed with a round table meeting in which the members carried on informal discussion of plant operations and problems. We welcomed E. H. Dupuy, assistant engineer of Wilson and Co. to membership.

At our first meeting of the New Year we had H. L. Todd as instructor furnished by the City of Memphis School Board to carry on the Refrigeration Course. He said he was pleased to get acquainted with the group and outlined the manner in which the course would be presented.

John Thrithart, field engineer for General Electric Co., showed a motion talking picture entitled "Shiny Rail." This picture told the story of the progress of the railroad locomotives from the first steam engine all through the modern steam engines, the electric locomotive, then the Diesel electric locomotive that is so much in use today. The picture was a thrilling one.

The chapter's new president, Cecil W. Sullivan, after the meeting invited the group to the dining room of the Hotel Chisca for refreshments and eats. He gave them a short but very effective talk as to what he hoped 1952 would mean for the chapter. He said he wished the convention was to be held here this year instead of last.

B. E. Smithers, one of the chapter's earlier presidents, acted as official installing officer and installed the new officers of the chapter for 1952, telling each new officer what his duties are for the office he was elected to and after swearing them in made each one pledge that he would do his utmost for the chapter during 1952.

C. W. Sullivan, as president, then appointed the following Committee Chairmen:

Educational Chairman, Alvis Clay.

Entertainment Chairman, Doug Smith.

Safety Chairman, Wm. K. Brooks.

Membership Chairman, T. G. Schmitt.

Operating Data Book Chairman, Harry Simpson.

Technical Advisor, Harry Walling.

Official Instructor, H. L. Todd.

A former member, W. S. Galloway, district manager of the Gulf Refining Co., St. Louis, died at St. Louis, Friday, January 5. He was a very active member while in Memphis and attended the St. Louis Convention.

Chicago

By E. B. Jones

THE Refrigeration Course was presented by Harold Michler. It dealt with expansion valves and included material on hand type valves, as well as low side floats and high side floats. Several members were invited to enter into the specific discussion so the instructor was joined by Doug Benton and Gene Rytlewski to cover special points and questions from the audience.

Precautions were emphasized in the installation of hand expansion valves because some installers are inclined to think only of having the low pressure in the upper part of the valve to reduce the pressure on the packing. It was pointed out that this is an error because it brings many disadvantages. When hand expansion valves are installed this way the whole upper part including the stem is frosted over. This tends to bring on rusting and pitting and makes the valve difficult to operate. In addition, as Doug Benton pointed out, when the temperature and pressure are low on the evaporating side air may leak in around the bonnet and yet this source of non-condensable gas will not be readily noticed.

The lesson proceeded into a discussion of using a pig-tail connection to elevate float valves above the actual top of the liquid in the vessel being controlled. Also it was brought out that a high liquid level, in some cases above the top pipe of the evaporator, does not necessarily increase heat transfer but only tends to result in carry-back of liquid to the compressor. For this reason the design of the evaporator and the location of the liquid level under maximum duty should be considered when the location of the float valve is determined.

This was the first meeting attended by Bert McKenna who recently transferred from San Francisco Chapter. He was introduced and expressed pleasure at being with the group. The attendants were divided into two teams and entered into a quiz contest on refrigeration matters. At the end of the contest the two sides were tied. Some of the questions entailed rather rapid work on the part of the members of the panels.

St. Louis

By K. M. Holaday

SNOW, sleet, and freezing rain combined to make the home fireside very attractive on Monday evening, December 17, the date of St. Louis Chapter's annual Christmas party. About a third of the expected members did brave the storm, however, and the party was a cosy and pleasant affair, after all. There is some doubt about the intelligence of anyone who will leave the comforts of home on a cold, wet, slippery, winter night, but the ones who weren't smart enough to know better had a wonderful time. There was plenty to eat and drink, movies, and card-playing, and nearly everybody felt good enough to join the singing.

The regular twice-a-month classes in the new NAPRE refrigeration course were resumed in January. Instructor John Dabbs has been doing a grand job, and the regular attendance of about 25 members in the class shows that there is genuine interest in this program. Lecture demonstrations, discussion, and questions and answers have created real stimulation to study the lessons.

NAPRE Department

New Orleans

By Leo Vivien

FOLLOWING the convention our representative gave reports of the program and activities. All the members who attended praised the program. It was surprising to note that the lectures and discussion were so well remembered. Many of the lectures were explained to the members with blackboard sketches. A couple of members who attended the Memphis Convention stated that their opinion of conventions was immeasurably changed. They felt that you really obtained useful information, and the contact with engineers from other parts of our country was invaluable.

The classes conducted by Instructor B. Mancuso have covered many very helpful subjects. In connection with instrumentation he brought various instruments used in plant operation and maintenance and described their use and value to the engineer. Under care of equipment he covered electric motors, belting and drives, hoists, pumps, compressors, machine measurements and clearance. At the following meeting the subject was humidity and humidity controls. At the final meeting of the year he reviewed the entire course.

Chairman Frank Chase announced that Professor Arthur M. Hill, Head of Mechanical Engineering of Tulane University, would conduct the new Refrigeration Course by Guy King. The course will start at the second meeting in January, 1952. Mr. Chase was given a rousing vote of approval for securing so able an instructor as Professor Hill.

During the business session of the final meeting for 1951 the following officers were elected to serve during 1952:

President, B. J. Mancuso.

First Vice President, James Chaisson.

Second Vice President, Nathan Forest.

Third Vice President, Milton D. Mancuso.

Recording Secretary, Leo J. Vivien.

Financial Secretary, Eugene Orth.

Treasurer, George J. Whitman.

Sergeant-at-Arms, Joseph Vernaci.

Educational Chairman, Frank L. Chase.

Board of Directors, Louis Howat, Chairman; M. R. Bellinger, D. Fischer, F. X. Gillio, J. Prager and M. Olivier.

San Francisco

By Dick Kelahan

THE final meeting of the year was dedicated to Bert McKenna who left shortly after to take up his new position as Chief Engineer of Central Cold Storage Co., Chicago. A long time active member of the chapter, Bert has contributed much toward its operation and progress. He is also a member of the National Board of Directors.

A large group of members came to see Bert off and wish him well. As

a memento and token of appreciation he was presented with a brief case.

The special speaker at the meeting was Hugh Krampe, member of the chapter, who discussed cold storage doors, their construction and application, and answered a number of questions from the audience.

The officers elected at the previous meeting were installed on January 9 in a simple ceremony by Wilbur Roberts, retiring president:

President, Walter Sandholt.
First Vice President, Herschel May.
Second Vice President, Frank Cordoza.
Treasurer, Charles Stewart.
Sergeant-at-Arms, Fred Imsand.
Recording Secretary, Ray Toddhunter.
Corresponding Secretary, Dick Kelehan.
Members Board of Directors: Orman New, Bill Orton and Marshall Garlinger.

Professor Don Bryant who has been conducting the sessions on refrigeration engineering presented some of the final material in the earlier series and announced the date for starting the new course based on the text by Guy King.

We congratulate Joe Scattini who has been appointed chief engineer of the Guerrero Street plant of Golden State Co. Ltd.

Mark your calendars for February 13—that will be Ladies Night for San Francisco Chapter. A Valentine Day party is being arranged for that evening by the chapter.

Los Angeles

By Fred Herr

AN OVER-FLOW crowd of 115 members and guests appeared for Los Angeles Chapter's first 1952 meeting at the Terminal Club on January 16. The attraction was a spaghetti-and-meat ball dinner at 6:30 p.m., and an interesting speaker in the person of affable Ralph De Palma, an almost legendary auto racing figure in Southern California.

Entertainment Committee Chairman Ed L. Nelson thought up the spaghetti-and-meat-ball touch in honor of De Palma, who is famous for both cooking and eating that dish.

The exceptional turn-out took the committee by surprise and made it necessary to provide extra tables for the overflow. Adding to the throng was the fact that quite a few fathers brought along their young sons to hear De Palma tell inside facts about Indianapolis Speedway racing. One-hundred and four members partook of the truly masterful meat balls and spaghetti, with some 10 more straggling in later for the meeting.

Chapter President Edgar M. Marrs presided at the business session which was called to order at 8 o'clock. Among the guests introduced were Elwood Riggs of Warren, Ohio; Glenn Lloyd, San Francisco representative of the Hawkins Chemical Company; L. T. Evans of Portland, Oregon; and W. E. Wilkinson, member-at-large, who for the past seven years served as refrigeration engineer for Hawaiian Tuna Packers, Honolulu, T. H. Six fathers proudly introduced their young sons as "future members of the NAPRE." Henry Hawkins, president of the Hawkins Chemical Company, was host to his entire office and sales staff.

Two new members were initiated: R. W. Anderson of the Electric Storage Battery Company; and E. E. Joyce, Vender Machine & Engine Company.

Both applications bore the name of Donald M. Byl as the signer-upper, and when his name was read, a groan escaped one member: "There goes Don again. He ought to give the rest of us a handicap." Membership Chairman W. R. Burnett subsequently reported that Don was already far in the lead in the 1952 campaign, and appears to be a good bet again to top the chapter in individual effort for bringing in new members.

Mr. Burnett predicted considerable competition for Los Angeles chapter from mid-west and Deep South chapters. He urged each member to follow literally the 1952 slogan: "A new member for You in 1952."

Herbert Royden reported that Walter E. Alderman is confined to a sanitarium in Inglewood, Calif., and would welcome occasional visits from members to talk a bit of shop.

Treasurer E. T. Quinn disclosed that the 1952 issue of the Membership Index will be ready to go to press in several weeks and will most likely be ready for distribution around March 1 to 15. Mr. Quinn annually takes on this chore and every year manages to turn out an Index that is an improvement on the preceding one. The handy booklet lists the name, address, business and residential phone of every member of Los Angeles and Colton Chapters.

Frank Elliot introduced the speaker of the evening, Ralph De Palma, a representative of the safety department of the General Petroleum Corporation. A personable and likeable chap, De Palma literally took the membership by storm with his rapid-fire mode of talking and his facility as a story teller. He prefaced his narration of speedway experiences with a serious talk on safe driving. This was followed by an extemporaneous talk by the former race driver on colorful experiences during the days when he was driving Fiats, Simplexes and other now nearly forgotten models of cars in the Indianapolis races in the decade between 1909 and 1920, climaxed by his winning the 1915 race.

Extremely amusing was his way of telling of how his car was first across the finishing line in the 1912 race, but he was disqualified because he and his mechanic had pushed the car the last three-eighths of a mile after it had broken a connecting rod. Since 1909, De Palma has seen all excepting three of the Indianapolis races, either as a participant or a spectator.

The program closed with the showing of a color film "The Fastest 500," dealing with the 1951 running of the Indianapolis automobile race.

Colton

By H. O. Bonter

THE first meeting of the period was held at the Santa Fe ice plant in San Bernardino and was very interesting. The special speaker was R. A. Johnson, By-Products Division, Pacific Lumber Co., who showed a motion picture on the history of Redwood and the Redwood Industry.

In northern California the trees are cut and sawed into lumber for building material. It will not warp or decay like other wood. It was pointed out that young trees are growing to take the place of those cut down so that there will be a ready supply in the future. Some sections of the forest have been set aside as national parks and visitors find them interesting and enjoyable.

In addition to redwood lumber the Pacific Lumber Co. makes numerous by-products from redwood bark and chips. These include insulation, products for agriculture; also one product to be mixed with mud in oil well drilling. The meeting closed with the usual lunch and prize contest.

At the time of making this report Secretary Bonter was in the hospital where he had returned for further treatment and operation. He expected to be back in Colton in late January.

At the first meeting of the New Year the chapter elected the following officers:

President, Alvie Miller.
First Vice President, T. C. Bangs.
Second Vice President, H. J. Mintert.
Sergeant-at-Arms, Duncan Meyers.
Directors, F. J. Scherer, C. H. Purkiss and E. V. Berchtold.

Fresno

By K. W. Findley

THE officers elected to serve Fresno Chapter during 1952 are:

President, J. C. Bryant.
Vice President, T. R. Hagar.
Secretary-Treasurer, K. W. Findley.
Sergeant-at-Arms, C. P. Shupe.

The subject of the educational section of the meeting was Safety and Accident Prevention in Refrigerating Plants. Several members took part in the discussion to relate experiences and draw information from published material. The meeting was held in the plant office of the Pacific Fruit Express Co.

Yakima

By Elmer Toop

THE annual election was held at our first meeting of the year and the following officers were elected:

President, Guy Stoutenburg.
Vice President, Ray Strait.
Recording Secretary, Galen Sutton.
Secretary-Treasurer, Elmer Toop.
Guard, Murray Hoggarth.

We have been having excellent attendance at the meetings. The interest in the Refrigeration Course is probably the greatest factor. We are pleased to welcome Carl Castell of the Holzinger Cowiche plant to membership.

McKenna to Central Cold Storage Co.

AT THE first of the year Bert C. McKenna, formerly of San Francisco took up his duties as chief engineer of the Central Cold Storage Co., Chicago. The company operates four refrigerated warehouses in the Chicago area.

Bert C. McKenna

A resident of San Francisco for a number of years, Mr. McKenna has had broad experience in food storage and processing plants in that area. Recently he was chief engineer for the Golden State Co. Ltd., large dairy and ice cream plant operators in California.

An active member and worker in the NAPRE for many years, Mr. McKenna is a past president of San Francisco Chapter and a member of the Board of Directors of the national organization. Through papers and discussions he has been a frequent contributor to the educational program of the association.

Cole to Preco, Inc.

AVEREILL Cole, member of the National Board of Directors from Michigan City, Ind., became a representative of Preco, Inc., on January 1. Presco manufactures railroad equipment, including fans for refrigerator cars. Mr. Cole will continue to live in Michigan City and will represent the company in the midwest and eastern territory. Formerly for some years he had been associated with the refrigerator car research projects of the Association of American Railroads.

Young Goes to Laramie

EUGENE Young, formerly of Modesto, Calif., has been transferred by the Pacific Fruit Express Co. to Laramie, Wyo., where the new 400 ton ice plant is getting into operation. Mr. Young, who is a member of Stockton-Modesto Chapter, has become assistant plant manager for PFE at Laramie.

Moves to Singapore

P. K. SARKAR who recently has been taking additional work in refrigeration in England has accepted a position as engineer with Alliance Engineering Co. Ltd., Singapore. Originally he joined as a member-at-large in India where he was associated with the engineering department of a large manufacturer.

Steggel in Marine Work

MEMBER-at-large L. E. Steggel writes that he has moved to Ilford, Essex, England, where he is now engaged in installing refrigeration equipment in His Majesty's ships. The equipment includes new design multiple cylinder V type compressors with capacity control and other modern equipment.

Strike Forces Sale of Seattle Ice Cream Plant

BECAUSE of the impasse of a strike, the ice-cream plant with its valuable ice-making and extensive ice-cream making equipment, is to be sold by Swift & Co. in Seattle. The local of the teamsters union there demanded that the well-known packing firm which had expanded into the ice-cream making business at Seattle with new cold facilities, assume the financial burden of a health and welfare plan for employes. This they demanded with the further demand that the company have no voice in how this money would be spent. Even though the management of the plant offered to pay employes the added amount of the cost of the plan, the teamsters' union would not be satisfied, and called the strike. Upshot is that decision has been made by Swift that it will not be profitable to re-open the plant.

British Exports

DURING October, refrigerating machinery to the value of $3,527,731.20, weighing 2,551 tons, was exported. Comparable figures for October, 1950, were 2,050 tons valued at $2,638,736.80. Monthly average was 236 tons valued at $92,486.80.

NAPRE Department

German Refrigerator Exports Increase

EXPORTS of refrigerators this year are expected to be twice as large as in 1950, it was stated at the recent meeting at Cologne of the West German Refrigerating Industry Association.

As a result of the war, the industry lost much of its production facilities, and considerable time was required to catch up with the technical advances made meanwhile by foreign manufacturers, Director Erich Fuchs of the AEG, chairman of the association stated.

Despite these difficulties, it had been possible to expand exports substantially during the past two years, and while the industry had not yet reached the high level of the American industry, it had now regained its prewar position and its products were of first rate quality. In 1950, 100,000 household refrigerators were exported from Western Germany. This year, exports are likely to reach 200,000 units.

Director B. Katzenberger of the Brown Boveri Co. stated that exports could be considerably bigger still if domestic sales were not so small. The small inland market, he said, makes it impossible to undertake any mass production which in turn results in higher unit prices. The need for more extensive acceptance of refrigerators by the general public is evident from the fact that an estimated 8 percent of all foodstuffs spoil in households because of lack of refrigeration.

Cuba Plans Expansion of Cold Storage Facilities

A CONSIDERABLE increase in cold storage facilities in Cuba has taken place over the past two or three years reports the Canadian Government Foreign Service. Many projects are either under construction or under study by the National Development Commission to provide sufficient cold storage space in all the principal cities through the island of Cuba.

The principal slaughterhouse in Havana is expanding its space to provide a maximum capacity of 25,000 head of cattle. Ample cold storage facilities should help to insure the availability of beef supplies all year round. In the meantime, plans are being considered for importation of fresh and jerked beef to overcome temporary periods of shortage.

Frozen Foods

*Reg. U. S. Pat. Off.

PREPARATION PACKAGING FREEZING STORAGE DISTRIBUTION DESIGN CONSTRUCTION EQUIPMENT

Preliminary Frozen Pack Estimates for 1952

THE National Association of Frozen Food Packers has completed estimates of important packs of 1951 frozen fruits and vegetables. The estimates made thus far are as follows:

Cut Corn: More was packed in 1951 than in any preceding year. The tabulation indicates production in frozen form of 44,511,584 pounds, nearly 35 percent greater than last year's pack of 32,997,732 pounds. Production in western states was almost twice as great as a year ago, and the pack in the midwest was also higher. In the east and south, however, output was down a bit.

R.S.P. Cherries: The 1951 pack totaled 99,017,977 pounds according to the N.A.F.F.P. estimate. This total is larger than any preceding year except 1950, and is only about five percent smaller than the 1950 record high pack of 104,458,625 pounds. On a regional basis, a significant reduction in pack is indicated for the midwest, but most of this was offset by increases in other regions. Both in the northeast and in the west, the 1951 pack was appreciably larger than last year.

Strawberries: The 1951 pack of these berries amounted to 109,039,913 pounds, about 30 percent smaller than the record high production in 1950, the Association's figures indicate. Pack totals for 1951 were down sharply in all regions. The 1950 pack was 153,812,374 pounds.

Asparagus: Production was 23,186,981 pounds, about 4 percent larger than last year and greater than in any preceding year except 1946, the NAFFP estimated. The 1950 pack was 22,309,199 pounds.

Turkey Freezing

A PROGRESS report from Hans Lineweaver at Western Regional Research Laboratory, Albany, Calif., states that not long ago experimental packs of turkeys (over 800 lbs. of toms and almost 1,000 lbs. of hens) were prepared and stored at Fresno, Calif., in cooperation with Fresno Consumers Ice Company and Cudahy Packing Company.

Consumers Prefer Sugared Frozen Peas

THAT consumers prefer frozen green peas to which sugar has been added has been demonstrated in tests conducted by the Sugar Research Foundation, Mt. Vernon, Wash., and confirmed by Dr. W. V. Cruess of the University of California, who conducted similar research work in 1949.

Of 749 individuals who sampled both the sweetened and unsweetened peas, 543 prefer those to which 3 percent of sugar by weight had been added. Only 206 preferred peas packed in their natural state without added sugar. Those who preferred the sugar sweetened peas said they were more tender, had same uniform texture, and more nearly resembled new fresh peas. The peas were packed last year for the Sugar Research Foundation and held under commercial storage conditions at the plant for eight months.

Newly picked peas have a relatively high sugar content, but a part of it is lost in blanching, cooling in water and fluming, and because of the lapse of time between harvesting and freezing. Although many packagers of frozen peas recommended that sugar be added when cooking, replacement of the lost sugar can be more closely controlled in the freezing plant than in the kitchen.

Frozen Food Inspections Show Increase

A RECORD volume of frozen fruits and vegetables was inspected for quality and condition during the year ended June 30, the U. S. Department of Agriculture has reported. The service, supervised by the Fruit and Vegetable Branch of the Production and Marketing Administration, inspected nearly a billion pounds of frozen foods.

Some 134 fruit and vegetable processing plants owned by 104 companies were approved to pack under continuous Federal inspection as of June 30. Under this operation, USDA said, inspections of frozen and canned fruits and vegetables increased 45 percent and 10 percent respectively over the previous year.

Studies on Freezing Salmon for Canning

FACTS revealed in studies by M. E. Stansby and J. Dassow of U. S. Fish & Wildlife Service (Seattle Station) of freezing salmon for canning are particularly important because the canned product reveals shortcomings that must be the primary concern of future research and industrial action. These are bacterial actions before and during freezing, oxidation of fats during storage, formation of protein curds. These troubles show up as canned product of reduced quality. Extended basic study would have great value. Protein curd formation requires basic study, not only in fish but in other foods. Meanwhile, as pointed out by Mr. Stansby, immediate and thorough freezing, food glazing and 0 F holding are measures that must receive adequate consideration. (Commercial Fisheries, April 1951).

Frozen Poultry Shows Gains in Consumption

THE consumption of all poultry has shown recent increases and the same proportion holds true of quick frozen eviscerated poultry. In June, 1951, sales were 30 percent ahead of the same month a year ago; in July, 30 percent higher; in August, September and October, each 15 percent higher compared to the previous year. In most areas quick frozen poultry showed the same general increase.

Bakers Are Interested In Freezing Products

A MEETING of bakers in Oakland, California, recently, addressed by Paul P. Loga of the American Restaurant Association, revealed a keen interest in freezing surplus stock and in labor saving through freezing. Col. Logan opened and reviewed the subject of frozen baked goods and many of the bakers voluntarily offered their experience and many were enthusiastic about it. Freezing baked goods could reduce quantities that become stale and could avoid unattractive hours of labor such as the early morning. It looks like something that could be developed.

The Government and the Warehousing Industry

(Continued from page 22)

quirements for civil defense with other government programs as well as the civilian economy.

Question: Do you foresee any expansion in the size of the staff required to carry out your assigned responsibilities?

MR. OSGOOD: It is anticipated that the staff of the Warehousing and Storage Division, DTA, will not require expansion much beyond the present authorized personnel unless the emergency becomes more acute.

Bigger Handling Costs

(Continued from page 22)

released in a reasonable time—the cold storage warehouseman can with a minimum of handling give the proper attention that perishable food products demand and handle the extra load of peak production without delay in the best interest of the shipper, receiver, carrier and consumer.

Dayton Section A. S. R. E.

A TALK by William Goroc and Carl Balcomb from the photographic laboratory of Wright-Patterson Air Force Base in Dayton was presented at the November meeting of the Dayton Section, American Society of Refrigerating Engineers. Slides illustrating modern aerial photographic equipment and three dimensional color pictures of aerial surveys taken over Germany and Korea were shown. Developments in the technique of aerial reconnaissance were discussed. V. M. Lathers of Barber-Colman Company then spoke about duct design and air distribution, giving particular attention to methods of reducing friction losses.

Science Foundation Grants Fellowships

APPROXIMATELY 400 fellowships will be awarded for graduate students in engineering, mathematics, physics, medicine, and biology for the year 1952-53 by the National Science Foundation.

Fellows may pursue their training at accredited nonprofit institutions or similar institutions abroad which are approved by National Science Foundation. Stipends will vary with the academic status of the recipients. Fellows will be expected to devote full time to advanced scientific study or scientific research for the tenure of the fellowship.

Spring Meeting A. S. R. E.

THE 39th spring meeting of the American Society of Refrigerating Engineers will be held at the Hotel Biltmore, Atlanta, Ga., June 1-4, 1952. The Georgia section of the society will have charge of arrangements.

C. T. Baker, consulting engineer, has been named chairman of the entertainment committee. Roy Goree, branch manager of Frick Company, is chairman of the tours committee and Gordon L. McWilliams, vice president of Refrigeration Appliances, Inc., and William Applegarth, partner of Industrial Trades Institute, will handle publicity for the meeting.

St. Louis Section A. S. R. E.

AN ILLUSTRATED talk was presented by V. M. Lathers of Barber-Colman Co., at the November 13 meeting of the St. Louis Section, American Society of Refrigerating Engineers.

Slides were shown by Mr. Lathers which illustrated correct and incorrect locations of supply and return grilles for heating and cooling. The slides were photographs taken in the Barber-Colman laboratory, and many of them showed air flow patterns by means of titanium tetrachloride smoke. Particularly noteworthy were the smoke pattern photographs showing the effect of adding turning valves to dust elbows and grille approaches.

Also illustrated was the aspiration effect of flow from an outlet, where a relatively small quantity of primary air from an outlet can induce movement in a much greater quantity of room air. This effect was illustrated by a sequence of photographs taken just after a smoke bomb was released beneath a wall outlet in a test room.

Ice May Help Cure A-Bomb Burns

CRUSHED ice may be a good treatment in emergency for people burned in atomic bombings. So writes Dr. S. E. Flynn in California Medicine. Ice was used successfully on some 50 men burned aboard a navy ship in wartime. The usual materials for treating burns had run out of supply, he said.

The ice relieved shock and pain, apparently helped reduce loss of blood plasma, possibly helped reduce bacterial growth. In A-bombings, Dr. Flynn says, so many people might be burned that available doctors couldn't use enough of the standard methods of treating burns.

Book Review

BASIC REFRIGERATION. Principles, Practice, Operation by Guy R. King. 526 pages, hard bound, size 6 x 9 inches. 340 illustrations. Published by Nickerson & Collins Co., 433 N. Waller Ave., Chicago 44. Price $6.00.

A PROFESSOR in a west coast university writes "The Guy King book is the most complete and easiest to understand that I have ever encountered." The author planned it that way. Basic Refrigeration was designed to give a good working knowledge of modern refrigeration, principles and practice. Beginning with the fundamentals, it progresses step-by-step through principles, equipment, application, operation and servicing. Common refrigerants are all given equal treatment and large and small equipment are covered.

There is no complicated mathematics in the book; the treatment of the subject is complete and logical. An unusual number of illustrations supplement the text. Of some 340 illustrations, the majority are special drawings which detail points in easily understood fashion. It is offered as a reference for operating and construction engineers and is recommended as a primary text in trade and vocational schools. In a little more than two months it has already been chosen as official text by several educational organizations. In schools where thermodynamics receives specific attention, Basic Refrigeration is an excellent text to correlate theory and practice and to bring to the student a good knowledge of current industry methods.

Philadelphia Section A. S. R. E.

WITH slides and verbal descriptions, the progress made in air conditioning and refrigeration during the last twenty-five years was presented at the December 7 meeting of the Philadelphia Section, American Society of Refrigeration Engineers.

Thirteen members of York Corp., took turns explaining and illustrating with slides how equipment which had been considered "hot stuff" in 1926 had been completely "cooled off" by today's advanced products.

The usual approach taken by the program was well received. Considerable interest was shown in the display of up-to-date equipment which included cutaways of York V/W and hermetic compressors, a package type ice cuber, a residential air conditioning unit, and a fan finned air conditioning unit.

Poultry Committee Advises Research

STATING that automatic candling of eggs would help reduce the cost of marketing graded eggs, the RMA Poultry Advisory Committee at its meeting here January 14-16 recommended continued emphasis on efforts to develop the necessary devices and methods. Candling at present constitutes one of the most expensive operations in the egg handling industry.

In its review of USDA research, the Committee urged that the entire U. S. Department of Agriculture be designated a defense agency. It called attention to the importance of food to national strength. The group also recommended that the Department devote a higher percentage of its research effort to fundamental studies as a means of providing the basic information needed by industry and other agencies in seeking practical solutions to their problems.

The Committee further recommended that more effort be devoted to disseminating research results more effectively, so producers and processors could have the findings more quickly and put them to use promptly. Discussion centered on means of reaching groups not now taking advantage of research reports.

A series of conferences was proposed to find ways of obtaining closer cooperation between various Departmental agencies and the poultry industry on handling problems of immediate mutual interest.

The Committee operates under the Research and Marketing Act of 1946 and advises the Agricultural Research Administration. The members reviewed current research projects and in general reaffirmed the priorities given them at the previous meeting. Among these in the field of marketing, in addition to the candling of eggs, are training of retailers, developing more effective ways of keeping eggs clean on the farm, studying effective storage temperatures for poultry, improving packaging materials, developing improved market information, and prepackaging.

In the field of production, emphasis was given to poultry breeding investigations, poultry diseases, studies of turkey physiology, and poultry feeding. In the field of utilization, projects receiving prime consideration were the processing and preserving of poultry and eggs so they will not lose their inherent quality, sanitation measures to protect poultry products from bacterial contamination, and the nutritive value of eggs.

Members of the Committee present were: Edward W. Priebe, Jr., (chairman), Priebe & Sons, Inc., Chicago; Andrew Christie, Christie Poultry Farms, Inc., Kingston, N. H.; W. Andrew Carey, Stockton, N. J.; Leland J. Graham, Southern States Marketing Cooperative, Baltimore; Richard Hanson, J. A. Hanson & Son, Corvallis, Ore.; Victor W. Henningsen, Henningsen Bros., New York City; Ralph E. Janes, Janes Bar Nothing Ranch, Austin, Texas; Warren C. Newton, O. A. Newton & Son, Bridgeville, Del.; L. N. Thompson, Poultry Producers of Central California, San Francisco; and Dr. Charles W. Upp, Louisiana State University, Baton Rouge. H. E. Slusher, Missouri Farm Bureau Federation, Jefferson City, was unable to be present. Henry Marston of the ARA is executive secretary of the Committee.

Chicago Section A.S.R.E.

THE Chicago Section American Society of Refrigerating Engineers meeting Thursday evening, December 13, heard a very interesting discussion on the design and use of multiple effect compressors by Harold B. Howe, president of the Howe Ice Machine Company. The company has been producing these compressors for the last 30 years.

Multiple effect compressors differ from the split suction and booster compressors, and were defined by Mr. Howe as a compressor, the design of which permits gas of two different suction pressures to be introduced into the same cylinder, one charge upon the other, the second charge compressing the first charge up to its own pressure without mechanical effort. It is not complicated, for a compressor of the port type contains the same number of moving parts found in a standard compressor.

Multiple effect compressors, he said, show a decidedly lower initial investment cost for equipment and building. There are also substantial savings on power and maintenance expense in plants requiring both low and high temperature work. These machines are also practical in one temperature plants.

This type of machine, although possessing many advantages, was never generally adopted in this country, he said. A number of European manufacturers do produce these compressors, and Mr. Howe said that the main market for his company has been throughout the world.

Ample evidence of the popularity of this compressor with foreign users was illustrated when Mr. Howe had projected pictures of actual installations of which he gave a technical explanation of each.

The young engineers' meeting, headed by Mike Goddard, spent a very interesting hour with W. W. Morgan of the Arctic Engineering Corporation, who gave them an excellent review of how to estimate refrigeration jobs from the blueprints of jobs in his actual experience.

Sales and Reorganizations

Dunedin, Fla.—The Florida Citrus Exchange has purchased the Snow Crop Concentrating plants here and at Aburdale and also the single strength plant at Frostproof at a sales price of $11 million. Snow Crop becomes the exclusive selling agency for Snow Crop frozen concentrates, as produced by the Exchange, for a ten-year period, with options providing for two additional ten-year periods. Snow Crop retains complete ownership of its label.

Chicago, Ill.—Morris Fisheries has bought the freezing plant at 734 Fulton from the Atlantic Fish & Oyster Co. Modernization of the plant is planned. When completed it will be able to freeze 50,000 pounds daily.

Grand Forks, N. D.—The Dunlevy Ice & Fuel Co. has sold the ice portion of its business to the Grand Forks Ice & Fuel Co.

Wapakoneta, Ohio—Assets of the Koch Beverage and Ice Company, including the brewery where beer has been manufactured since 1862, was sold at public auction recently. The brewery was placed in the hands of a receiver last July in a suit filed by Michael Lambros of Lima, president of the company.

Simpson, Pa.—Mrs. Margaret M. Zinram, secretary-treasurer of the Fell Brewing Co., has indicated the definite end of the brewery. It will be sold.

Milton, Ore.—The processing, freezing and storage facilities at the Milton-Freewater frozen foods plant of F. G. Lamb & Co. of Weston, Ore., have recently been disposed of by sale to the Smith Frozen Foods of Oregon, for a figure close to a half-million dollars, General Manager Milan Smith of Pendleton, Ore., recently announced. Hitherto the Milton-Freewater unit has been used mainly for peas, but its extensive equipment in the future will be used for a multiplicity of purposes in the frozen food field of the Oregon region.

Icy Item

Spokane, Wash.—Planning large expansion of activities, the Chef Frozen Foods, Inc., recently filed an amendment to its incorporation set-up, which increases the number of shares of this corporation to fifty thousand, while reducing the value of each to $1.

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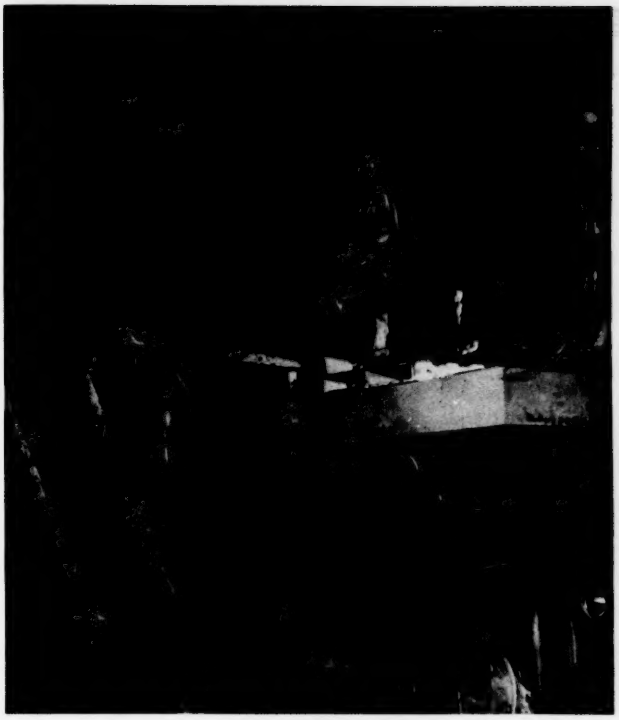
Oakland 1, Calif. Portland 7, Ore.
Washington 6, D. C. San Juan 23, P. R.



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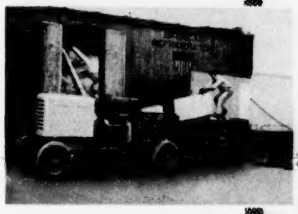


The "Mobil-Icer" is here icing a carload of carrots at the rate of 5 tons every 7 minutes. The trailer mounted "Mobil-Icer" is ideal for team track icing as it can be towed by the truck carrying the ice. The unit is powered by an 8-cylinder Ford industrial engine. Capacity is 55 tons per hour.

M-337

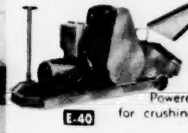
The M-337, known as "Mobil-Icer," is ideal for team track icing with a capacity of 55 tons per hour. Powered by an 8-cylinder Ford industrial engine.

G-100

The model G-100 rolls easily on 3 rubber-tired, ball bearinged wheels. Powered by an 8 cylinder Ford industrial engine. Capacity 55 tons per hour.

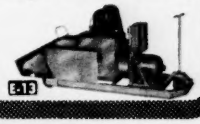
G-35

The G-35 crusher-slinger is for icing operations where its capacity of 750 pounds per minute is adequate. Takes full 300 pound blocks.



E-40

The E-40 combines high capacity with the quietness and dependability of the electric motor. Capacity 55 tons per hour. Powered by a 10 HP electric motor for crushing, 30 HP motor for slinging.



E-13

The E-13 has a capacity of 600 pounds per minute. Uses one 3 HP and one 10 HP electric motor.

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CONVENTION CALENDAR

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February 12-13, 1952
Detroit Leland Hotel, Detroit, Mich.
EDWARD W. JACKSON, Secy.

GEORGIA ICE MANUFACTURERS ASSOCIATION
February 19-20, 1952
Ansley Hotel, Atlanta, Ga.
RICHARD W. FLORRID, Secretary

SOUTHERN ICE EXCHANGE
February 19-20, 1952
Ansley Hotel, Atlanta, Ga.
RICHARD W. FLORRID, Secretary

OHIO ASSOCIATION OF ICE INDUSTRIES
February 25-26, 1952
Deshler Wallick, Columbus, Ohio
ELIZABETH SHANNON, Secretary

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
February 28-29, 1952
Fairmont Hotel, San Francisco, Calif.
JACK L. DAWSON, Exec. Mgr.

NATIONAL ASSOCIATION FROZEN FOOD PACKERS
March 3-7, 1952
Conrad Hilton Hotel, Chicago, Ill.
L. S. MARTIN, Secretary

NORTH CAROLINA ICE ASSOCIATION
March 10-11, 1952
Hotel Sir Walter, Raleigh, N. C.
LEWIS H. POWELL, Secy.-Treas.

SOUTHWESTERN ICE MANUFACTURERS' ASSN.
March 12-14, 1952
Hotel Texas, Fort Worth, Texas
P. A. WEATHERRED, Secy-Counsel

PACIFIC DAIRY AND POULTRY ASSOCIATION
March 15-18, 1952
Hotel del Coronado, Coronado Beach, Calif.
RUNE F. GORANSON, Exec. Secy.

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
March 20-21, 1952
Leland Hotel, Springfield, Ill.
WM. D. WRIGHT, Secretary

VIRGINIA ICE MANUFACTURERS ASSOCIATION
March 20-21, 1952
George Mason Hotel, Alexandria, Va.
H. H. SNYDER, Secretary

EASTERN STATES ICE ASSOCIATION
March 20-21, 1952
George Mason Hotel, Alexandria, Va.
SAMUEL FREER, Secretary

NEW ENGLAND ICE ASSOCIATION
March 27, 1952
Kenmore Hotel, Boston, Mass.
RAYMOND T. WILBER, Secretary

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
March 26-28, 1952
Chinook Hotel, Yakima, Wash.
L. F. MARSH, Secretary

INDIANA ASSOCIATION OF ICE INDUSTRIES
March 31-April 3, 1952
French Lick Springs Hotel
ROBT. W. WALTON, Secretary

THE REFRIGERATION RESEARCH FOUNDATION
May 2-4, 1952
Roosevelt Hotel, New Orleans, La.
H. C. DIEHL, Director

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
May 5-8, 1952
Roosevelt Hotel, New Orleans, La.
WM. DALTON, Executive Vice-Pres.

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Board of Trade Bldg., Indianapolis, Ind.

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With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice **COMPLETELY OUT** of your cooling, chilling, freezing or cold storage.

It uses Niagara No-Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity **NEVER** cut down by ice building up progressively on refrigeration coils.

Now, a **NEW** design No-Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature —not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment — one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use—both for freezing and for moderate temperatures—for large "live" loads as in meat chilling or in fruit and vegetable precooling — for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

For complete information write to the Niagara Blower Company, Dept. IR, 405 Lexington Avenue, New York 17, New York.

If you need extra capacity . . . the Niagara "No-Frost Method" can help you get it with your present compressor.

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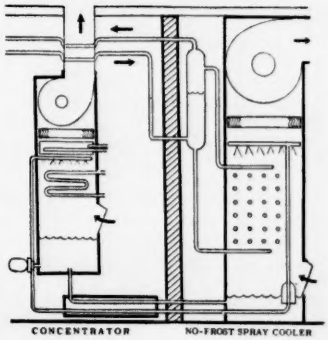
A simple method, easily maintained. Saves a third of your refrigeration cost . . . Ask for Niagara Bulletins 118 and 119.



DEATHS

John A. Evans

THE death of John A. Evans, owner and manager of the Centralia Coal & Ice Co., Centralia, Ill., occurred January 7 at his home following a stroke. He was 76 years old. Mr. Evans came to Centralia from St. Louis two years ago where he had been general manager of the Old Ben Company of Chicago. He was a member of Centralia's Rotary Club and deacon and elder of the Unionville Church. He is survived by his widow, Mrs. Jessie Evans, two sons, Charles M. of Fayetteville, Ark., and John H. of Oklahoma City, Okla., and one daughter, Mrs. Frank Manglidorf of Phoenix, Ariz.

HUGH D'ANNA, vice president of the Arctic Ice Co. Inc., Plant City, Fla., died November 9, 1951, of a cerebral hemorrhage. He had returned that day from a two weeks vacation spent with his children in Georgia, North Carolina and Tallahassee. There had been no previous illness and he appeared in good health and spirits. He became affiliated with the Arctic Ice Co. Inc., as vice president in 1948.

ROBERT G. KIRKENBURG of 313 Hickory Road, assistant superintendent of the Diamond Ice and Coal Co., Charleston W. Va., died December 27 in McMillan Hospital. Death was attributed to a complication of ailments. He was 63 years old. He was born at Wheelersburg, Ohio, but moved to Charleston when a young man and had been employed by the ice company more than thirty five years.

JAMES H. DENNEDY, inventor of the Coldspot refrigerator, died at the age of 67 on November 9 at Evansville, Ind., after a long illness. Until ill health forced his retirement a year ago, Mr. Dennedy was a director of the Seeger Refrigerator Company and a consulting engineer.

IRVING UNDERWOOD, part owner of the Bayport Ice Co., Stillwater, Minn., died January 10. Mr. Underwood was a native of Stillwater and had spent most of his life in that vicinity. He was a partner and manager of the Bayport Ice Company for many years. He was 52 years old.

LOUIS BOMBERGER, director of the Consolidated Ice Co., Pittsburgh, Pa., for twenty-five years, died January 8. He was 78 years old. Mr. Bomberger was also a leather goods dealer on the south side of Pittsburgh before his retirement.

CHARLES B. HILL, who had been in the ice business in Dallas, Texas, since 1906, died January 8. He was 71 years old. Mr. Hill was the owner of two ice concerns, the Superior Ice Company in Dallas and the Independent Ice Company at Temple.

Fires and Accidents

Greencastle, Ind.—Fire destroyed the old ice plant building in South Greencastle which recently housed the Handy Ice Cream plant. The loss, according to Fire Chief William Lawrence is approximately $45,000 with only a portion covered by insurance.

Rockport, Me.—An ammonia compressor exploded at the Penobscot Bay Ice Company plant, causing damage estimated at $8,000, Maynard Graffam, company president, reported.

Aiken, S. C.—Fire of undertermined origin destroyed the Southern Cities Ice plant early December 28.

Shamrock, Texas—The Shamrock Ice Company plant was destroyed by fire on December 30. Louis and Russell Hill, owners, estimate the value of the plant at $75,000.

Aetnaville, W. Va.—Firemen from the nearby city of Bridgeport again extinguished a fire in the local ice plant here. Because of the large quantity of sawdust used for ice storage, the fire has continued to smoulder since last July.

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SEMI-STEEL SHUT-OFF VALVE

Highest grade non-porous metal—full size ports—clean cut threads. Back seated stem — Shank design base—perfect alignment. Long life packing ring.

ALL-STEEL GAUGE SETS

All-Steel Construction. Automatic shut-off of liquid in case of glass breakage. Composition packing rings give long life, no-leak seal.

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TRAFFIC NEVER STOPS

when you repair your floors with Permamix.

Easy to apply—sets instantly—long wearing for year around use indoors or out—WILL NOT FREEZE—can be stored indefinitely and used in any temperature—lowers maintenance costs amazingly.

Here's all you do: Clean hole in any type floor, spread primer supplied in drum, fill in with Permamix, tamp and dust with cement or floor dust, resume traffic immediately. It's that easy, for Permamix feather edges and no cutting or chipping is required. No skilled labor is necessary, you need no special equipment, you have no mixing, waiting or production delays when you repair or patch your floors the easy, fast Permamix way. Comes in handy, durable 50 lb. net weight drums.

See us at the 18th Annual Products Show, Space 1-A Mezzanine Floor, Hotel Sherman, February 19, 20, 21.

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Sterling DEPENDABLE REFRIGERATION

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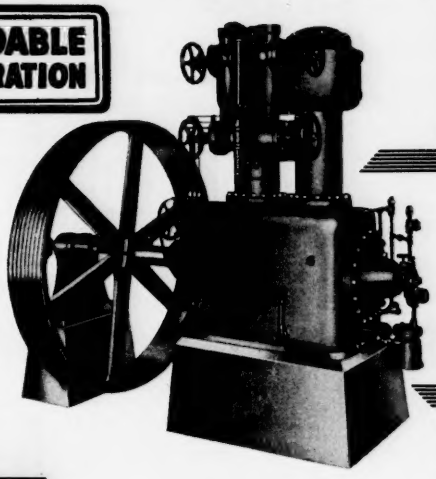
Now is the time to check your equipment for the '52 season . . . if you need additions, replacements or repairs to your present refrigerating system, or a complete new plant—remember, more than 50 years of STERLING superiority are at your service. Contact your nearest STERLING distributor . . . he can make immediate delivery on most models of STERLING equipment.



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WEATHERPROOFED ICE SIGNAL CARDS

Coated Both Sides With Paraffine

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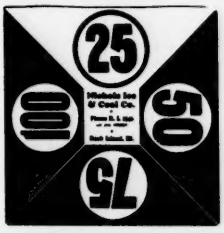

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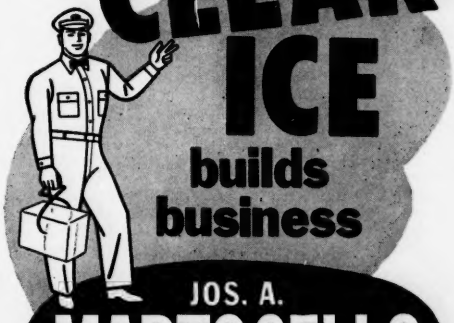

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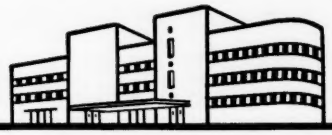
NEW PLANTS and IMPROVEMENTS



This Department each month presents the more important developments covering new constructions, as well as additions, improvements, remodeling, and installations of new equipment in ice and cold storage plants and other industrial plants that use refrigeration. News notes on all such new constructions and improvements are invited.

Alabama

Mobile, Ala.—Crystal Ice Co. here is operating two new S & S ice vending units.

Arkansas

DeQueen, Ark.—A move to secure a bonded cold storage warehouse here to take care of poultry and other farm crops, was started recently at a meeting of hatchery men, poultry dealers and agriculture workers, with members of the board of directors of the chamber of commerce.

Canada

Ottawa, Can.—Ottawa Ice Co. Ltd., is now vending ice from an S & S station.

California

Claremont, Calif.—Plans are under way to more than double the size of the cold storage facilities of Union Ice Company here. Inasmuch as the site is in Claremont's industrial zone, no zoning variance is required for the construction project.

Florida

Jacksonville, Fla.—Duval Ice & Coal Co. is now operating a new S & S ice vending station.

Georgia

Columbus, Ga.—A building permit for a $50,000 alteration program at the Atlantic Ice and Coal Company, 1625 First Ave., was issued recently by the city building inspector. George B. Gordy, plant manager, announced.

Idaho

Wallace, Idaho—The Wallace Meat Company recently completed a $35,000 improvement program at its plant in Nine Mile canyon, north of town. The work was started last June. Belden Brewer is plant manager.

Illinois

Alton, Ill.—Hyndman Ice & Fuel of this city is now using new S & S ice vending equipment.

Massachusetts

Pittsfield, Mass.—The new plant of the Berkshire Frosted Foods, wholesale distributors, was recently opened. The new prefabricated plant, measuring 160 by 60 feet, features a freezer box with dimensions of 60 by 60 ft. and whose walls will serve as walls of the main building, was constructed at a cost of $115,000.

Maine

Rockport, Me.—The Penobscot Bay Ice Company is replacing compressor damaged in a recent explosion with a new 9x9 inch machine and expects to be in operation soon.

Michigan

Stevensville, Mich.—Fruit Processors, Inc., has added two freezer rooms, each 8,000 cubic feet to the plant here under a recently completed modernization program. Sub-zero temperatures are provided by a cold blast type system in one room and a coil unit in the other.

New Jersey

Mahwah, N. J. — Consumers Ice Service company is now operating two new S & S ice vending machines.

Oklahoma

Tahlequah, Okla.—Tahlequah's processing plant for frozen foods will be enlarged by more than 50 percent.

Oregon

Portland, Ore.—L. M. Schwary & Sons, Parkrose merchants, plan to add a two-story structure to the present store building which will have a large refrigeration plant. The shopping center will cover the entire block from N. E. 107th to 108th Ave. on Sandy boulevard. The expansion will cost more than $100,000.

Roseburg, Ore.—Douglass Ice and Storage Company has installed two S & S ice vending machines. One of the new units is located here and the other at Myrtle Creek. Both block and packaged ice is being vended.

South Carolina

Conway, S. C.—Horry Ice Company is now operating two new S & S ice vending machines.

Texas

Brownsville, Tex.—L. W. Kautz of Brooklyn, N. Y. and associates are planning the erection of a quick freezing plant here. The new organization is studying the possibilities in freezing and processing shrimp for producers.

Brownsville, Tex.—Central Power & Light Company has installed two new S & S ice vending machines.

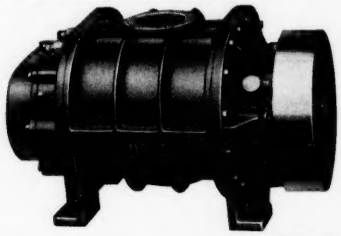
El Paso, Tex.—Construction of an addition to the Harry Mitchell Brewing Co. was announced recently by Charles A. Kuper, president and general manager of the firm. The addition will provide 4500 square feet of storage space and will cost approximately $13,000.

El Paso, Tex. — Consumers Ice & Fuel report installation of a new S & S ice vending station.

Washington

Walla Walla, Wash. — The Pacific Fruit Express recently completed a new $275,000 car icing plant which is operating at the Union Pacific railroad installation at Hinkle. The plant has a capacity of 60 refrigerator cars and is about 1,800 feet long, and will replace two other icing plants, one at Wallula and the other at Rieth.

Before you buy *any* blower compare these essentials... V-P-L VOLUME PRESSURE LOW POWER COST



These factors are of prime importance to the satisfactory operation of your plant. Since the early days of manufactured ice, R-C Rotary Positive Blowers have proved their ability to deliver a positive supply of air to the ice cans. Ask us about your requirements or send for Bulletin R-C 1247, without obligation.

REG. U. S. PAT. OFF.

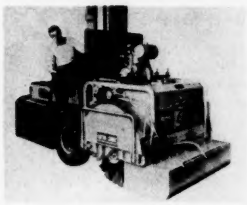
Roots-Connersville Blower Corporation
522 Columbia Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE
BLOWER BUILDERS SINCE 1854
ONE OF THE DRESSER INDUSTRIES

NEW MACHINERY APPLIANCES—PROCESSES

New Power Sweeper

A NEW, low-cost, powered sweeper designed as an attachment to fit any fork lift truck of 1,500 lbs capacity and up has been introduced by Little Giant Products, Inc., Peoria, Ill. It is operated by the truck operator, and is used indoors and out for sweeping in factories, warehouses, airports, aircraft plants, railroads, ship docks, etc. It has sweeping speed up to 80,000 sq ft per hour, at truck speed of five miles per hr. Easily attached to lift truck, as an intergral part of truck during cleanup hours, it has a self-contained spray system for dust control. A 6.8 hp gasoline engine turns at 2,400 rpm, but an integral clutch reduction unit and sprockets step down brush revolutions to 164 rpm.



Little Giant Power Sweeper

This sweeper is the pick-up type, with brush whisking dirt and refuse into a full-width, floating dust pan. Pan dumps easily. Through mounting forks at an angle this unit can be used for snow removal brushing snow off to one side. Installation time not over three minutes, connection by means of 4 eye-bolts and clamping bars. No tools required. Tank capacity 30 gallons. Unit now in production and available through lift truck dealers.

Multi-Purpose Grease

AN IMPROVED multi-purpose grease for use in general industrial applications—Texaco Multifak 2 Grease—has been introduced by The Texas Company. It is recommended for use in situations which require one high grade multi-purpose grease for a variety of operations.

Research officials responsible for the new formulation point out that Multifak has excellent shear stability, outstanding resistance against water washing, and good pumpability at low temperatures. It is highly suitable for bearing lubrication over a wide range of temperatures and can be used efficiently for an extensive variety of industrial lubrication jobs.

MANUFACTURERS' NEWS

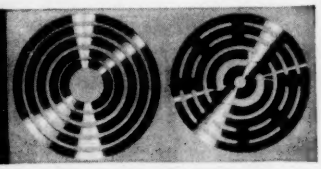
American Bitumuls Names Turner President

THE American Bitumuls and Asphalt Company has announced election of C. W. Turner as president of the Company, and named C. W. Stewart to the newly-created position of vice-chairman of the Board of Directors. Mr. Stewart has been president of the Company, a subsidiary of Standard Oil Company of California.

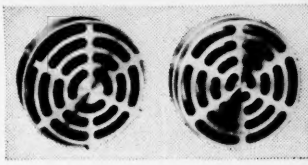
Mr. Turner, who will move into his new job after the first of the year, has been Standard's Honolulu district manager since 1940. Before going to Honolulu, he was assistant manager of the Company's Lubricant Division.

American Bitumuls and Asphalt Company, with headquarters in San Francisco, is a nation-wide organization with fourteen district offices, including plants and refineries for the manufacture of asphalt, Bitumuls and emulsified asphalt located throughout the United States, and in Puerto Rico.

Compressor Efficiency



has no equal in the race for greater output



VOSS VALVES have no equal

for they assure maximum compressor efficiency

It is a matter of record that everytime an ordinary compressor valve is replaced with a specially designed VOSS valve, the immediate result is increased efficiency and greater output . . . and this record covers thousands of installations, as letters and reports testify.

VOSS VALVES and PLATES are made to specifications for all types of air, gas and ammonia compressors; from 1 to 16" in diameter and for pressures from 3 to 4,000 pounds and for speeds from 110 to 1750 rpm.

VOSS VALVES and PLATES are NOT STAMPED; they are milled and machined for perfect fit; of finest heat treated alloyed steels; they are ductile; resist fracture, high temperatures and corrosion; withstand fatigue; won't work-harden, chip, splinter, crack or score cylinder walls.

INCREASE EFFICIENCY AND OBTAIN GREATER OUTPUT . . . send us the name, bore, stroke and speed of your compressors. Our detailed proposal will be sent without obligation.

VOSS VALVES and PLATES ASSURE

- Quiet, vibration-free operation
- 20 to 60% more valve area
- Less power consumption
- Low pressure loss
- Normal discharge temperature
- Lower operating costs
- 35% more work

J. H. H. VOSS VALVES REG. U.S. PAT. OFF.

J. H. H. VOSS CO. INCORPORATED

783 EAST 144th STREET, NEW YORK 54, N. Y.

Miller Appointed Secretary of RISAC

MYRON D. MILLER has been appointed as full-time secretary and safety code consultant of the Refrigeration Industry Safety Advisory Committee (RISAC), with offices at NEMA headquarters, 155 East 44th St., New York City. He succeeds the late Cyrus W. Miller.

Mr. Miller, born in Cleveland, Ohio, received his B.M.E. from Ohio State University in 1944, the Master of Public Administration degree from Wayne University in 1946, and obtained a working knowledge of law from his evening studies at New York University in 1949.

His background includes experience in production work with the Navy, as Lieutenant (jg). His first assignment was in a high priority production project, the V.T. (radio proximity) fuse, at the National Carbon Company, Winston-Salem, N. C., where he administered a large Navy facilities contract. His second assignment was doing liaison between Naval Ordnance Laboratory and Eastman Kodak Company.

For the last three years, Mr. Miller was a division manager with the Commerce and Industry Association of New York, Inc., (the chamber of commerce in New York City). His activities included organizing and staffing the Air Conditioning and Refrigeration Panel that has been working since December, 1950, on drafting a modern refrigeration code for New York City. This code is expected to be finished by this March and introduced in the City Council. It is based largely on the provisions of the Safety Code for Mechanical Refrigeration (ASA-B9.1), as approved by the American Standards Association, Inc. He staffed industry committees that prepared code amendments, such as the drafting of a new welding code.

Mr. Miller also organized a special industry committee that has been working on New York City legislative proolems that affect the refrigeration industry, such as contractor licensing, licensing of operators of refrigeration units of specific capacities, and regulation of installation and maintenance of refrigerating equipment.

RISAC is sponsored jointly by representative groups of manufacturers of air conditioning and refrigeration equipment, including the Air Conditioning & Refrigerating Machinery Association, the Compressed Gas Association, Inc., the National Electrical Manufacturers Association, and the Refrigeration Equipment Manufacturers Association. Its purpose is to encourage the adoption of uniform safety practices and regulations with respect to refrigeration equipment and, in particular, the nation-wide acceptance of the Safety Code for Mechanical Refrigeration.

Frick Appoints Guild Assistant Sales Manager

THE appointment of Everett N. Guild as an assistant sales manager of Frick Company is announced by W. H. Aubrey, vice president and sales manager of the Ice and Refrigerating Machinery Department. Mr.

Everett N. Guild

Guild will be stationed at the main office and works of the Frick Company in Waynesboro, Pa.

Easier and Cheaper with

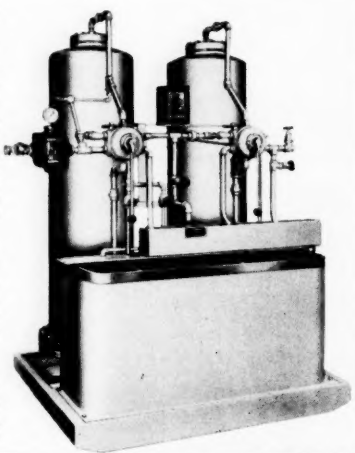
INDUSTRIAL Water Demineralizer

It's worth looking into . . .

The demineralization of water is not something new. It is used in the food industry, in the chemical and other industrial processing where chemically pure water is used in quantity. The very low cost warrants your looking into it.

Here are some of the advantages you get with an INDUSTRIAL demineralizer in ice making. Since the dissolved mineral salts in ordinary water are removed in passing through the ion-exchange resins, core-water removal and replacement is unnecessary. Losses due to cracking are greatly reduced. Freezing at the lower brine temperature increases daily yield. And the bulk of the cake of ice is clearer—your customers will notice that.

If you will send us an analysis of the water you are using, the quantity you need, and at what rate (gallons per hour) we will send you information on INDUSTRIAL demineralizers, estimate of costs, performance data, etc. Better do it now.



A typical two-bed INDUSTRIAL Water Demineralizer. Standard models available with capacities up to 1000 gph. Special units of any capacity engineered to requirements.

FILTERS Pressure Type · PUMPS Centrifugal · CORROSION TESTING APPARATUS Salt Fog • Humidity

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RUBBER DIVISION
Vulcanized Linings • Molded Products

WATER DEMINERALIZERS

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

★ *Saves Space*

★ *Saves Weight*

★ *Saves Cost*

CAN BE USED WITH ANY REFRIGERANT

Manufactured by

DETROIT ICE MACHINE COMPANY

2615 Twelfth St., Detroit 16, Mich.

DIMCO Fin Coils solve low headroom problem
View of Mezzanine Lard Storage Room
Peters Sausage Company, Detroit, Mich.

BATEMAN CRUSHER

For Ice Station or Store

Model 25
PLATFORM CRUSHER

Bateman Crusher has four operating adjustments of the sizing grate that sizes ice from drug store to 1¾"

Hopper opening takes a 25-lb. block of ice.

The legs are 24 inches high, allowing a 25-lb. paper bag to rest under crusher. Has spout for filling paper bags.

Takes only 30 seconds to grind 25-lb. block of ice.

Due to drum and pick design, only a ¼ H.P. motor is required to operate this crusher.

A metal guard covers the fly wheel, belt and motor pulley.

SPECIAL PRICE: CRUSHER COMPLETE with ¼ h.p. motor, $145.00 FOB Mineral Wells, Texas

Bateman *Ice Processing Equipment*

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Speed Tube Cleaning!

WILSON

ELECTRICALLY DRIVEN

TUBE CLEANERS

- Save up to 67% in cleaning labor
- Reduced head pressures
- Heat transfer rate increased 35%
- Efficient film temperatures restored
- Mud, algae and slime completely removed
- No shutdown required on open shell condensers
- Indispensable for keeping condensers at peak efficiency

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CEMCO

Double Gig Ice Hoist
Fast - Sturdy - Dependable -

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Columbus 8, Ohio

THE INDEX LINE

ICE DEALERS SUPPLIES

Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1951 catalog.

INDEX COUPON AND SUPPLY COMPANY
LA PORTE, INDIANA

Mr. Guild has been identified with the refrigeration industry for 25 years, originally with the Copeland Sales Company as commercial sales engineer, and for sixteen years with the Norge Division of Borg-Warner Corp., eventually becoming director of research. In 1949 he became general sales manager of Victor Products Corporation. He was born in Louisville, Kentucky, and was graduated in electrical engineering at the University of Cincinnati.

His new activities will be directed primarily toward the promotion of sales by factors, dealers and contractors, particularly on such equipment as unit air conditioners, packaged ice makers, etc.

Paltridge Appointed by Refrigeration Engineering

THE appointment of H. H. Paltridge as vice-president in charge of sales and assistant to the president has been announced by RECO Products Division of Refrigeration Engineering Corp. Mr. Paltridge has been associated with the Refrigeration and Air Conditioning Industry in design, production, field construction, and sales, continuously since 1931 except for three years during the last war when he served as Executive Officer of a Seebee Construction Unit in North Africa and France. Since 1948 he has been New York District Manager for Baker Refrigeration Corporation and will continue in this capacity with the assistance of an increased staff. He will be in charge of the new New York headquarters of RECO Products Division and RECO International Division located at 150 Nassau Street, New York.

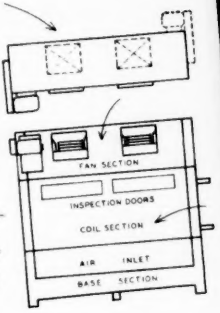
H. H. Paltridge

Pages from an ENGINEER'S NOTEBOOK

MEMO: Purchasing Dept.

SUBJECT: Acme Industrial Unit Coolers

1. All fabricated steel parts are hot-dip galvanized for longer wear.
2. In the fan section the wheels are galvanized and dynamically balanced; shaft itself is cadmium plated.
3. All bearings are outside the unit—readily accessible for maintenance.
4. Sectional arrangement of units allows great flexibility in installation.
5. The finned coil units come in 4, 6, 8, or 10-row coils—makes it very easy to obtain the proper balance between coil surface and our compressor.



RECOMMEND WE SPECIFY ACME

B.W.C.

MEN who know always specify Acme

Acme products have always been preferred for their fundamental engineering and modern production methods and design. Since 1919 their name has been a by-word in the heavy refrigeration and air conditioning industry for the latest in design, quality, and performance. Write today for a catalog on any of the items in Acme's complete line.

Address Dept. IR

ACME PRODUCTS

ACME INDUSTRIES, INC., Jackson, Mich.

AIR CONDITIONING and REFRIGERATION DIVISION

Continuously serving the air conditioning and refrigeration industry since 1919

Finlay Is Appointed Union Bag Representative

THE appointment of Raymond H. Finlay, Jr., as sales representative is announced by the Union Bag & Paper Corp. Mr. Finlay will supervise sales of Union Standard Products and Flexible Packaging in Missouri, Kansas, Nebraska and Iowa. Formerly of the Company's Chicago Sales Office, he will headquarter in Kansas City, Mo.

Raymond H. Finlay, Jr.

Vivian Incorporates

THE Vivian Manufacturing Company announces that it is now a Missouri Corporation with the following officers: Vivian K. Barber, president and treasurer; Bert C. Hosselkus, Jr., vice-president and general manager.

THE BUYERS DIRECTORY

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 72

ABSORBERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

AIR AGITATING SYSTEMS AND FITTINGS
Martocello & Co., Jos. A., Philadelphia, Penna.

AIR COMPRESSORS
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
Carrier Corp., Syracuse, N. Y.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.

AMMONIA COMPRESSOR VALVES
Frick Co., Waynesboro, Pa.

AMMONIA COMPRESSORS
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA CONTROL DEVICES
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.

AMMONIA FLOAT VALVES
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesvoro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA MANUFACTURERS
Armour Ammonia Div., Armour & Co., Chicago, Ill.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bower Chemical Mfg. Co., Henry Philadelphia, Pa.
du Pont, Polychemicals Dept., Wilmington, Delaware

AMMONIA MASKS
Acme Protection Equipment Co., Chicago, Ill.

AMMONIA PURIFIERS
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
International Salt Co. Inc., Scranton, Pa.
Vilter Mfg. Co., Milwaukee, Wisc.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA RECEIVERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. F., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA VALVES & FITTINGS
Acme Industries, Inc., Jackson, Mich.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

ARCHITECTS AND ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

ASPHALT PRODUCTS
American Bitumuls & Asphalt Co. San Francisco, Calif.

AUTOMATIC CONTROL DEVICES
Alco Valve Co., St. Louis, Mo.
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Rex Engineering & Sales Co., Oklahoma City, Okla.
Vilter Mfg. Co., Milwaukee, Wis.

BAGS, ICE
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Corp., New York, N. Y.

BAGS, WATERPROOF PAPER
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Co., New York, N. Y.

BEER COOLERS
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Penna.
Vogt Machine Co., Henry, Louisville, Ky.

BLOWERS
Frick Co., Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

BOILERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BOILER TUBES
Byers Co., A. M., Pittsburgh, Pa.

BOOKS—TECHNICAL
Nickerson & Collins Co., Chicago, Ill.

BRINE CIRCULATORS
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Penna.
Reynolds Mfg. Co., Springfield, Mo.
Roots-Connersville Blower Corp., Connersville, Ky.

BRINE COOLERS
Acme Industries, Inc., Jackson, Mich.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

BRINE SPRAY COOLING
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Penna.

(Buyers Directory continued on next page)

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FROM THE GROUND BELOW YOU

IN single or multiple units, Layne well and pump installations produce tremendous quantities of water at extra low cost. High efficiency designing, precision building and advanced methods of installation make Layne wells and pumps a highly practical and fully justified investment. Layne does the job complete; drills the wells, furnishes all casing, shafting, pumps, motors and sand screen. After complete testing, the system is delivered to you in perfect operating order.

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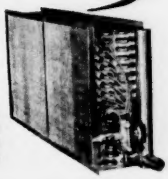
Layne WATER SUPPLY WELLS & PUMPS

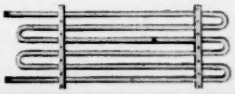
REMPE

Pipe Coils
Fin Coils
***For* Refrigeration, Air Conditioning, Heating**



Coils and Bends of any Metal, Size or Design. Engineered to your requirements. Designed and built for longest life and the least maintenance.

Send your problems to us for engineering assistance.



HEAT TRANSFER EQUIPMENT REMPE CO.

REMPE COMPANY
348 N. Sacramento Blvd., Chicago 12, Ill.

SERVING THE ICE INDUSTRY FOR 20 YEARS

Dependable . . Automatic . . Refrigerated

S&S ICE VENDING STATIONS

AND ICE VENDING EQUIPMENT

Write, Phone or Wire for Full Details and Prices!

S&S Vending Machine Co.

670 LINCOLN AVE., SAN JOSE, CALIFORNIA

1101 N. HIGHLAND, ARLINGTON, VIRGINIA

EVAPORATOR PRESSURE CONTROLS

AMMONIA COMPRESSORS

Wolf Linde

Est 1880

FREON VALVES UP TO 12"

AMMONIA VALVES AND FITTINGS

Manufactured and Sold by

DERSCH, GESSWEIN & NEUERT, Inc.

4849 West Grand Avenue Chicago 39, Illinois

THE BUYERS

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BRINE TREATMENT
International Salt Co. Inc., Scranton, Pa.

CALCIUM CHLORIDE
Solvay Sales Div., Allied Chemical & Dye Corp., New York, N. Y.

CAN DUMPS
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Penna.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

CAR ICING EQUIPMENT
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Tri-Pak Machinery Service Inc., Harlingen, Texas

CEMENT PATCHING
Permamix Corp., Chicago, Ill.

COILS
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Nipple Mfg. Co., Chicago, Ill.
Creamery Package Mfg. Co., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Howe Ice Machine Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

COLD STORAGE CONSTRUCTION
Armstrong Cork Co., Lancaster, Pa.
Frick Co., Waynesboro, Pa.

COLD STORAGE DOORS
Butcher Boy Cold Storage Door Co., Chicago, Ill.
Jamison Cold Stge. Door Co., Hagerstown, Md.

COMPRESSORS
(See Ice Making and Refrigerating Machinery)

COMPRESSOR VALVE PLATES AND DISCS
Voss, Inc., J. H. H., New York, N.Y.

COMPRESSOR VALVES
Voss, Inc., J. H. H., New York, N.Y.

CONDENSERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

CONSULTING ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

CONTROLLNG INSTRUMENTS
Taylor Instrument Companies, Rochester, New York

CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.

COOLING TOWERS
Frick Co., Waynesboro, Pa.
Vilter Mfg. Co., Milwaukee, Wis.

CORK INSULATION
Armstrong Cork Co., Lancaster, Pa.

CORROSION CONTROL
Wright Chemical Corp., Chicago, Ill.

COUPON BOOKS
Index Coupon & Supply Co., La Porte, Ind.
Vivian Mfg. Co., St. Louis, Mo.

COVERINGS (PIPE AND BOILERS)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.

CYLINDERS (GAS & LIQUID)
Byers Co., A. M., Pittsburgh, Pa.

DEIONIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DEMINERALIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DIP TANKS AND CAN BASKETS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Penna.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

DRIVES, TRANSMISSIONS
Frick Company, Waynesboro, Pa.

ELEVATING & CONVEYING MACHINERY
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.

ENGINEERS AND ARCHITECTS
(See Architects and Engineers)

EVAPORATIVE CONDENSERS
Niagara Blower Co., New York, N.Y.

EVAPORATORS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N.Y.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FEED-WATER HEATERS
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

FIBERGLAS
Armstrong Cork Co., Lancaster, Pa.

FIELD ICE SAWS
Gifford-Wood Co., Hudson, N. Y.

DIRECTORY

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FILTERS, CLARIFYING
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.

FILTERS, WATER
Frick Co., Waynesboro, Pa.
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.
Martocello & Co., Jos. A.,

FILTRATION EQUIPMENT
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.

FIN COILS
Acme Industries, Inc., Jackson, Mich
Howe Ice Machine Co., Chicago, Ill.
Rempe Company, Chicago, Ill.

FIRST AID SUPPLIES
Acme Protection Equipment Co., Chicago, Ill.

FITTINGS
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FLOAT VALVES
Mojonnier Bros. Co., Chicago, Ill.

FOOD FREEZING EQUIPMENT
Howe Ice Machine Co., Chicago, Ill.

FROZEN FOOD LOCKERS
Knickerbocker Stamping Co., Parkersburg, W. Va.

FUEL OIL PRE-HEATERS
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.

HAND TRUCKS
Ohio Galvanizing & Mfg. Co., Niles, Ohio

HOISTING APPARATUS
Capital Elevator & Mfg. Co., Columbus, Ohio
Reynolds Mfg. Co., Springfield, Mo.

HUMIDITY AIR CONDITIONERS
Niagara Blower Co., New York, N.Y.

HYGROMETERS
Taylor Instrument Companies, Rochester, N. Y.

ICE BAGS
Union Bag & Paper Corp., New York, N. Y.

ICE BLOWERS
Gifford-Wood Co., Hudson, N. Y.

ICE CANS
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Penna.
Ohio Galvanizing & Mfg. Co., Niles, Ohio

ICE CAN FILLERS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Penna.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

ICE CHIPPERS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Penna.
Vivian Mfg. Co., St. Louis, Mo.

ICE CHUTES
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Jamison Cold Storage Door Co., Hagerstown, Md.
Martocello & Co., Jos. A., Philadelphia, Penna.

ICE CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.

ICE CREAM PLANTS
Frick Co., Waynesboro, Pa.

ICE CRUSHERS
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Penna.
Tri-Pak Machinery Service Inc., Harlingen, Texas
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBE CONTAINERS
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Union Bag & Paper Co., New York, N. Y.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBERS
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBING MACHINES
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Lilly Co., The, Memphis, Tenn.

ICE DELIVERY BAGS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Penna.
Union Bag & Paper Corp., New York, N. Y.
Vivian Mfg. Co., St. Louis, Mo.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.

ICE MAKING AND REFRIGERATING MACHINERY
Carrier Corp. Syracuse, N. Y.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Enterprise Equipment Corp., Yonkers, N. Y.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Penna.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

(Buyers Directory continued on next page)

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BB BRAND
AMMONIA

Purity of product and immediate shipment are two good reasons for specifying Bower Brand. Please keep empty cylinder rotating.

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29TH AND GRAY'S FERRY ROAD
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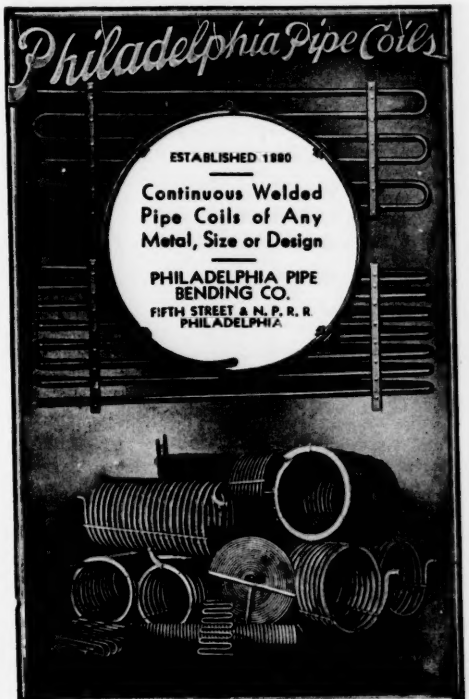
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Continuous Welded Pipe Coils of Any Metal, Size or Design
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FIFTH STREET & N. P. R. R.
PHILADELPHIA

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MAXIMUM B.T.U. TRANSFER
in "Packaged" Cooling Units

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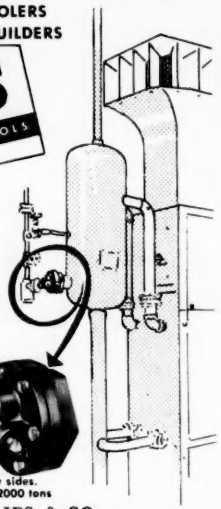
SHARP FREEZERS • ICE BUILDERS

Use
PHILLIPS
FLOAT CONTROLS



Instant response to wide variation in load is one major reason why the use of Phillips Float Controls contributes to high heat transfer efficiency in practically all cooling units. In addition, you gain maximum flexibility with a fewer number of valves to carry in stock because Phillips No. 300 and No. 301 Valves provide capacities of 2 to 50 tons for handling a majority of applications with the same mounting.

For complete satisfaction in Float Controls and Regulating Valves, combined with efficient engineering service help—willingly given—call on Phillips.

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Wright CHEMICALS

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OFFICES IN PRINCIPAL CITIES
Sole Distributor of Nelson Chemical Proportioning Pumps

THE BUYERS

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ICE PICKS AND PLANERS
Gifford-Wood Co., Hudson, N. Y.
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Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Penna.
Vivian Mfg. Co., St. Louis, Mo.

ICE PICK SCABBARDS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Penna.
Vivian Mfg. Co., St. Louis, Mo.

ICE PLANTS
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

ICE SCALES
Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

ICE TOOLS
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Penna.

INDICATING INSTRUMENTS
Taylor Instrument Companies, Rochester, New York

ICE VENDORS
Frick Company, Waynesboro, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
S & S Vending Machine Co., San Jose, Calif.

INSTANTANEOUS HEATERS
National Pipe Bending Co., New Haven, Conn.

INSULATING MATERIALS
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Pacific Lumber Co., San Francisco, Calif.

INSULATION ADHESIVES
American Bitumuls & Asphalt Co. San Francisco, Calif.

LOW TEMPERATURE EQUIPMENT
(See Ice Making and Refrigerating Machinery)

MAGNETIC FLOAT SWITCHES
Mojonnier Bros. Co., Chicago, Ill.

MASKA, AMMONIA
Acme Protection Equipment Co., Chicago, Ill.

MATERIALS HANDLING EQUIPMENT
Ohio Galvanizing & Mfg. Co., Niles, Ohio

OIL AND LUBRICANTS
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OIL SEPARATORS
King-Zeero Co., Chicago, Ill.
Rex Engineering & Sales Co., Oklahoma City, Okla.

OILS, CUTTING
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OILS, FUEL
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

PACKINGS
Frick Company, Waynesboro, Pa.
Vivian Mfg. Co., St. Louis, Mo.

PIPE COILS AND BENDS
Acme Industries, Inc., Jackson, Mich.
Chicago Nipple Mfg. Co., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PIPE WELDING
Acme Industries, Inc., Jackson, Mich.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

PIPING
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Frick Company, Waynesboro, Pa.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PISTON RINGS
Safety Seal Piston Ring Co., Ft. Worth, Tex.

PRESSURE BLOWERS
Martocello & Co., Jos. A., Philadelphia, Penna.
Roots-Connersville Blower Corp., Connersville, Ind.

PRESSURE REGULATORS
Taylor Instrument Companies, Rochester, N. Y.

PROPELLERS AND ROTARY PUMPS
Martocello & Co., Jos. A., Philadelphia, Penna.

PUMPING MACHINERY
Aurora Pump Co., Aurora, Ill.
Layne & Bowler, Inc., Memphis, Tenn.
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPING MACHINERY—AIR LIFT
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS, AMMONIA AND BRINE
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Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.

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PUMPS, ROTARY
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Roots-Connersville Blower Corp., Connersville, Ind.

PURGERS
Armstrong Machine Works, Three Rivers, Mich.
Frick Company, Waynesboro, Pa.
Rex Engineering & Sales Co., Oklahoma City, Okla.

RAW WATER FREEZING SYSTEMS
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Penna.
Vogt Machine Co., Henry, Louisville, Ky.

REBOILERS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

RECORDING THERMOMETERS
Taylor Instrument Companies, Rochester, New York

REFRIGERATED ICE STATIONS
S & S Vending Machine Co., San Jose, Calif.

REFRIGERATING AND ICE MAKING MACHINERY
(See Ice Making and Refrigerating Machinery)

RESPIRATORS
Acme Protection Equipment Co., Chicago, Ill.

RUST PREVENTATIVES
Bower Chemical Mfg. Co., Henry Philadelphia, Pa.
Wright Chemical Corp., Chicago, Ill.

SCORING MACHINES
Frick Company, Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Perfection Ice Scoring Machine Co., Fort Worth, Texas

SECOND HAND MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

SEPARATORS OIL, STEAM AND AMMONIA
Acme Industries, Inc., Jackson, Mich.
Frick Company, Waynesboro, Pa.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.

SHOULDER PADS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

SIZED ICE EQUIPMENT
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

SPRAY NOZZLES
Martocello & Co., Jos. A., Philadelphia, Penna.

STORAGE HEATERS
National Pipe Bending Co., New Haven, Conn.

STRAINERS
Martocello & Co., Jos. A. Philadelphia, Pa.

TANKS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

TARPAULINS
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

THERMOMETERS
Martocello & Co., Jos. A., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, New York

THERMOMETERS, RECORDING
Taylor Instrument Companies, Rochester, New York

TIERING MACHINES
Capital Elevator & Mfg. Co., The, Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

TRAPS, OIL & STEAM
Armstrong Machine Works, Three Rivers, Mich.
Rex Engineering & Sales Co., Oklahoma City, Okla.

UNIT COOLERS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.
Rempe Company, Chicago, Ill.

USED MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

VALVES AND FITTINGS
Alco Valve Co., St. Louis, Mo.
Frick Company, Waynesboro, Pa.
Henry Valve Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Pa.
Phillips & Co., H. A., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

VALVES, COMPRESSOR
Voss, Inc., J. H. H., New York, N.Y.

WATER COOLERS
Acme Industries, Inc., Jackson, Mich.
Niagara Blower Co., New York, N.Y.
Vogt Machine Co., Henry, Louisville, Ky.

WATER TREATMENT MATERIALS
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.
International Salt Co. Inc., Scranton, Pa.
Wright Chemical Corp., Chicago, Ill.

WELDING
Frick Company, Waynesboro, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

WELL SCREENS
Layne & Bowler, Inc., Memphis, Tenn.

WROUGHT IRON PIPE
Byers Co., A. M., Pittsburgh, Pa.

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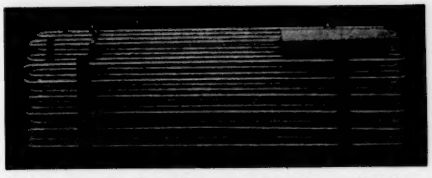
Whether your next job be for a single bend, or coil or complete Piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.



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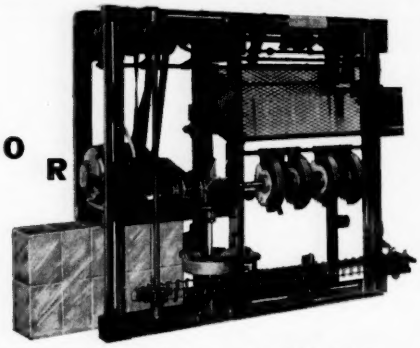

PERFECTION and MILLER ICE SCORING MACHINES

● Your Perfection or Miller Scoring Machine, providing the frame is in good condition, can be completely reconditioned and returned to you at a minimum cost. This service returns your Scorer to its peak operating efficiency and carries a "New Machine" guarantee.

● If it's spare parts you need, we have a complete stock for Perfection and Miller models.

For detailed information, write, call or wire:

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● For over 29 years, Perfection has built Ice Scoring Machines to the satisfaction of the Ice Trade . . . We have a variety of models to meet your every requirement as to type of machine and capacity.

The Perfection Ice Scoring Machine Co.
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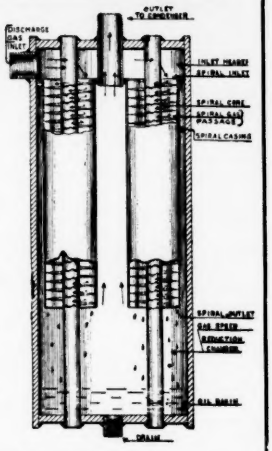
"King Zeero"

OIL SEPARATOR

STOPS OIL FROM ENTERING CONDENSER RECEIVER AND LOW SIDE



Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

When used in connection with air compressors, water is also separated with the oil.

Built for years of trouble free service. Mechanical details on request.

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1447-55 Montrose Ave., Chicago 13, Ill.

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All Used Equipment Is Reconditioned In Our Modern Machine Shop
THIS IS ONLY A PARTIAL LIST-WRITE ABOUT ANY REQUIREMENTS WHICH YOU HAVE
WE ARE BUYING ADDITIONAL EQUIPMENT ALL OF THE TIME

Compressors With or Without Motors

Item No.

1—4x4 York, 300 RPM 16
6—6x6 York's, 200 RPM 20
1—6x6 Frick, 257 RPM 21
2—6x6 York's, 400 RPM, forced-feed lubrication 25
2—6½x6½ Arctics, 350 RPM, forced feed lub. 30
1—7¼x7¼ Baker, 350 RPM, forced feed lubrication 35
1—7x7 Frick, 200 RPM 40
1—7½x7½ York, 200 RPM 51
2—7½x7½ Yorks, 350 RPM, forced-feed lubrication 54
1—7½x7½ York, 400 RPM, forced-feed lub. Late Type 55
1—8x8 Frick, 400 RPM forced feed lub. V-belt wheel 57
1—8x8 York, 400 RPM, forced feed lub., V-belt wheel 58
1—9x9 Arctic, 300 RPM, forced feed lub. 62
1—9x9 York, 200 RPM 71
1—9x9 Worthington, 325 RPM, forced feed lub. 72
1—10x10 De La Vergne, 360 RPM, forced feed lub. 73
1—10x10 York, 257 RPM, forced feed lub. 80

Item No.

1—10x10 Carbondale, 100 HP synch. motor, 350 RPM 81
3—10x10 York's, 225 RPM, semi-forced feed lub. 82
1—10x10 Frick, direct connected 100 HP Sync. Motor 84
1—10x10 York, direct connected 100 HP Sync. Motor 86
1—11x13 York, 164 RPM, forced feed lub. 90
2—12x12 Frick, direct conn. 150 HP synch. motor 98

Diesel Driven and Diesel Engines

1—8x8 York—Direct connected to 50 HP Fairbanks-Morse at 257 RPM 210

Steam Driven

1—8x8 Vertical York, 300 RPM direct connected 327

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10,000 feet wrought Iron pipe—2"—like new 451

Complete Ice Plants

1—15-ton electric driven plant 630
6—50-Ton Ice Plants, 10 can pull complete 631
Brand New 8 to 10-ton Clear Ice-Making Plants—110 Cans—Electric or Diesel Drive—2 Can Pull 632

Item No.

1—*247 Can, 22-ton ice plants, like new* 632A
1—35-38 ton New Clear Ice Making Plants 635
1—150 Ton Multi lift—1622 Can Plant 636
1—702 Can Plant—9 Can Pull 637
1—920 Can Plant—12 Can Pull 638
1—150 Ton Ice Plant—2 Tank 660

Traveling Cranes

2—4 Ton Overhead Traveling Cranes. 9 & 12 Can Grid.

Self-Contained Units

3—4x4 York & Fricks 742
1—5x5 York—390 RPM 743
1—4½x5 Lipman—360 RPM 744
1—3x3 Worthington 748
1—5x5 Frick—Forced Feed—400 RPM Latest Type 758

Used Ice Cubers

1—300 lb. ULINE, fully automatic cuber. 501
1—50 lb. F & E Safety Cuber 502

Condensers

3—100 ton shell and tube condensers retubed 919
1—125-ton, Vertical Shell & Tube, 196 2" tubes 921
1—120 ton, 216—2" retubed Vertical Shell & Tube 922
2—20 ton Horizontal—retubed 924

Ice Cans

4000 Cans—Like new—11"x22"x47" 950

ROBERT P. KEHOE MACHINERY CO., Inc.

REFRIGERATION EQUIPMENT

6 EUCKER STREET
RIDGEFIELD PARK, N.J.

PHONE: DIAMOND 2-8554
CABLE ADDRESS: KEHOEINC

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: $4.00 for 50 words or less; 70c for each additional 10 words or fraction thereof; $1 per line for bold face headings; $10.50 per inch for line listings.

POSITIONS AND HELP WANTED

YOUR OWN BUSINESS—with a minimum investment. A national organization offers you this opportunity in the fast growing soft ice cream business, with possible profits from $8000 to $15,000 per season. For full particulars write to Dari-Delite, 1524 Fourth Ave., Rock Island, Ill.

NEW MAIL SERVICE—Log analysis, bid analysis, operating check-up, shrinkage control advise. Get the most for your power input; 35 years experience. Reasonable fee; honest and accurate. Strictly confidential. C. Clark Fisher, Refrigeration Consultant, P.O. Box 348, Huntington Park, Calif.

POSITION WANTED — As chief refrigeration engineer or in a similar responsible position with a large plant or group of plants. Capable of handling the supervision of all operation, maintenance, remodeling and erection. Capable of keeping the operating costs at a minimum. I am 35 years of age, with 16 years experience in the industrial refrigeration field. Member of N.A.P.R.E. Have ability to get along with people and to handle men. References available upon request. Address Box FB-6, c/o Ice and Refrigeration.

ICE PLANTS—for sale

FOR SALE—15 ton raw water Electric power driven ice plant, complete; now in operation with good territory. County seat, 6150 population. Has approximately 180 ton storage. Consumers Ice & Cold Etorage Co., Mt. Vernon, Indiana.

FOR SALE—One man fully automatic ice plant. 52 tons of ice per day were pulled by one operator during an eight hour shift through the peak summer period of 1951 in Dallas, Texas. A York electric plant with an Arctic-Pownall tank of 720 cans, size 11"x22"x47". Plant must be dismantled and moved from present location by the purchaser. Priced to sell at $300. per ton or a total of $15,600.00. For further details contact Robert A. Shaw by telephone TRemont 6660, or write to 2918 N. Henderson St., Dallas, Texas.

FOR SALE—Complete ice plant—now operating—doing $30,000 annual volume with $8,000 profit. All platform and contract sales, no truck routes; easily operated. Plant consists of 10x10 Frick, 6x6 York, Euclid electric four ton crane, 49 ton capacity steel tank (22 grids of 15-300 lb. cans each) Miller electric scoring machine, Creasey ice crusher, brine agitators, air pumps, motors and miscellaneous equipment. Fine central location. No real estate involved but satisfactory lease agreement guaranteed. Will also dismantle and sell equipment separate. Inquire A. E. Namey, (formerly Blair Ice & Cold Storage Co.) 3100 Sixth Ave., Altoona, Penna.

WANTED

To purchase refrigerated warehouse *with* **R. R. siding**

1 Million cubic feet or more

BROKER
ADDRESS BOX FB-3
ICE AND REFRIGERATION
435 N. WALLER AVE.
CHICAGO, 44

USED EQUIPMENT-wanted & for sale

WANTED—8x8 or larger York or Frick ammonia compressor, with or without motor, instant water cooler; also interested in condenser and coils. W. E. Bittinger Co., R.D. #3, Hanover, Penna.

FOR SALE—Used 10x10 and 9x9 Frick ammonia high speed compressors, with or without motors—on shaft 4000 volt motors. North Pole Ice Co., Clarksburg, W. Va.

FOR SALE—1 Vilter compressor 10½x11½ with synchronous motor 150 h.p. installed new in 1948, operated approximately four months each year. Can be inspected and operated at Vigo Ice Company, 120 N. Water St., Terre Haute, Ind.

FOR SALE—York Corp. V.S.A. ammonia compressors; one 6½x6½, one 7½x7½, one 8x8. Also two 7x5 Pennsylvania Pump Co. air compressors. Two 12x10 Union Steam Pump Co. air compressors. All machines with or without motors. Stock of good used ice cans, 300 & 400 lb. sizes. David Gordon, 1502 Indiana Ave., Chicago 5, Ill.

FOR SALE—Several sizes of ammonia and Freon compressors, ice plants, coils, brine coolers, condensers, receivers, oil traps, agitators, Diesel engines. Write us your requirements. Parke Pettegrew & Son Company, 370 West Broad St., Columbus 8, Ohio.

FOR SALE
REBUILT USED EQUIPMENT

2—8x8 Frick ammonia compressors, slow speed.
1—7½x7½ York ammonia compressor, slow speed.
1—6x6 Frick compressor, high speed.
1—6½x6½ York ammonia compressor, slow speed.
1—6x6 York ammonia compressor, slow speed.
1—4x4 York ammonia compressor, slow speed.
1—3x3 Frick self-contained unit.
1—5¾x4" Frick booster compressor.

Address Box DC-2
ICE AND REFRIGERATION

FOR SALE—Two used 15"x16'-0" York horizontal 6-pass shell and tube ammonia condensers. Good condition; selling because of replacement with larger size. Martin Century Farms, Inc., Lansdale, Penna. Phone Lansdale 4678.

WANTED

Used automatic ice making equipment, in good condition, such as Vogt, Flake ice, etc., ammonia refrigerant. Ten to fifty ton units. State size, make, age and price. Also compressors for above equipment. Address Box FB-8, c/o Ice and Refrigeration.

FOR SALE—One 60 ton York evaporative ammonia condenser. One 10 ton horizontal brine cooler. 3x3 self-contained York, 3x3, 4x4, 5x5, 6x6, 7½x7½, 8x8 and 9x9 York splash lubrication compressors. Two 25 ton York shell and tube condensers. Receivers, all sizes. Four Freon suspended type blower units. One 10 ton Frick Freon unit. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE

Complete ice making plants, ammonia compressors, all sizes, shell & tube condensers, brine coolers, ice cans, valves and fittings.

B & E REFRIGERATING CO.
2 Orange St., Newark 2, N. J.
Phone Mitchell 3-7790 Cable Address "BERECO"

Don't try to compete with yourself by using that machine in your plant which is too small for the job! Scan this page for the things you need and sell your small equipment through a want ad.

EQUIPMENT FOR SALE

200 H.P. B. & W. 160# Boiler, 1931.
225 H.P. B. & W. 160# Waterwall, Boiler 1949.
(2) 252 CFM 40# Penn. Air Comp.
(5) 14'x20' Frick Dehydrators.
(3) 30'x16' Amm. Condensers (1) Receiver.
6 Ton S.N. double transfer Crane.
(1440) 300# Galv Ice Cans, Air tubes.
(2) Slat Conveyors (25 ft) (75 ft).
(4) 4696 sq ft Frick Vertiflow Coil units.
(4) 3 H.P. Vert. Brine Agitators.
160 Ton Vilter Elec. Amm. Comp.
80 Ton H. & C. Steam Amm. Comp.
Amm. Accumulators, Misc Valves & Fittings.
Gifford Wood Ice Stacker.
Ice Chipping Machine, 1 H.P.
1500 G.P.H. Cech. IJS H.P. water Softener.

ALL IN FIRST CLASS CONDITION.

POWER ENGINEER
915½ W. LaSalle Avenue
South Bend, Indiana

FOR SALE

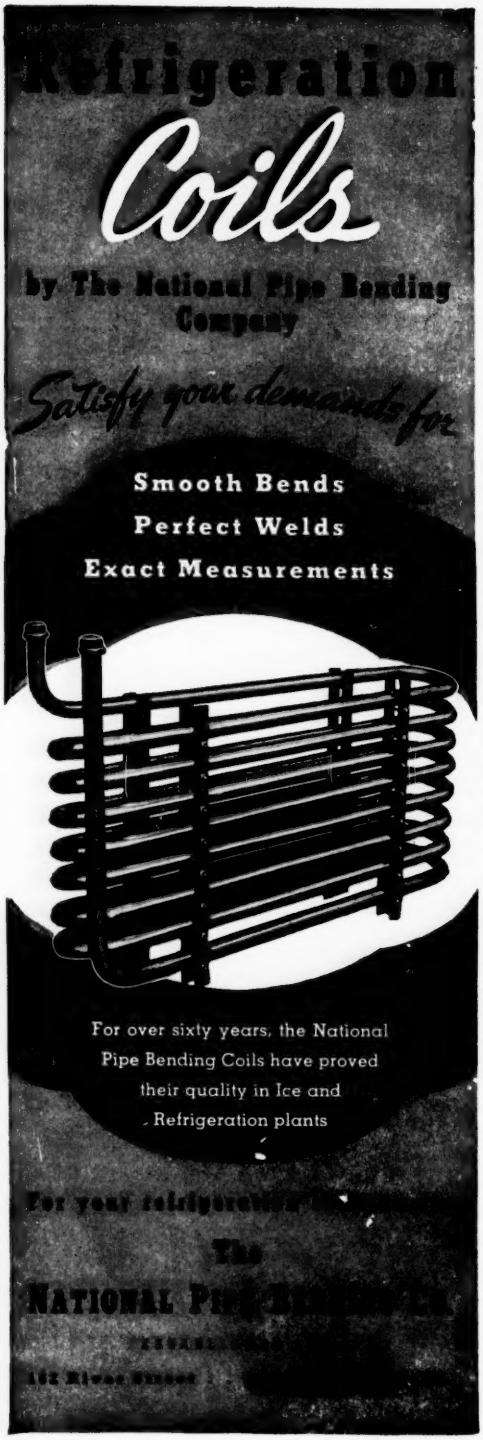
1—50 ton Frick ice plant, 27 can pull, evaporative condensers—may be inspected in operation.
1—150 ton York ice plant, 13 can pull—equal to new.
1—11x13 York ammonia compressor 257 r.p.m.
1—10x10 York ammonia compressor 300 r.p.m.
1—8x8 York ammonia compressor 360 r.p.m., V-belt drive, 60 h.p. motor, capacity reducing valves.
1—100 h.p. GE synchronous motor with coupling.
1—7½x7½ York ammonia compressor, high speed, forced feed lubrication, V-belt drive.
1—8¾x6 Frick booster compressor, V-belt drive.
2—Gifford-Wood tiering machines.
Scoring machines, blowers, pumps, etc.

JOHN F. CARSON
2829 N. Broad St. Philadelphia 32, Pa.
Phone BAldwin 9-8549

FOR SALE—ICE PLANTS & EQUIPMENT

20-50-60-100 Ton Ice Plants—Immediate Sale
Ice Cans—11 x 22 x 47"—Excellent Condition
Ice Cans—11 x 22 x 51"—Excellent Condition
1—York 12½" x 14½" Ammonia Compressor High Speed
1—Frick 12 x 12" Ammonia Compressor direct connected to Diesel Engine — can be purchased without Diesel.
1—York 10 x 10" Ammonia Compressor direct connected to synchronous motor 3/60/440 Speed 300.
1—York 10 x 10" Ammonia Compressor direct connected to 60 H.P. synchronous motor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor direct connected to 100 H.P. synchronous motor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor High Speed.
Parts for York 10 x 10" Cylinder Block, Top Heads, Pistons and connecting rod.
1—York 8 x 8" Ammonia Compressor direct connected to 60 H.P. synchronous motor 360 R.P.M.
1—York 8 x 8" Ammonia Compressor High Speed.
1—York 6 x 6" Ammonia Compressor High Speed.
1—Voss 6 x 6" Ammonia Compressor High Speed.
2—Frick 3 x 3" H.S. Self contained units.
Can supply motors for all compressors.
Low pressure blowers—all sizes.
Assorted sizes electric hoists and cranes ranging from 2 to 6 ton capacity.
2—Gifford & Wood Tiering Machines, 5-tiers.
1—Scoring Machine Perfection.
2—Sheppard Cranes 4 and 5 ton capacities—3 motor jobs.
Brine coolers, submerged shell and tube type.
1¼" and 2" Ammonia Coils, approximately 10,000 feet.
Send Us Your Requirements on Any Equipment You May Need.

ENTERPRISE EQUIPMENT CORPORATION
77-79 Alexander Street, Yonkers, New York
Cable; Address: **ENEQCO**
Phone: Yonkers 8-8118-9



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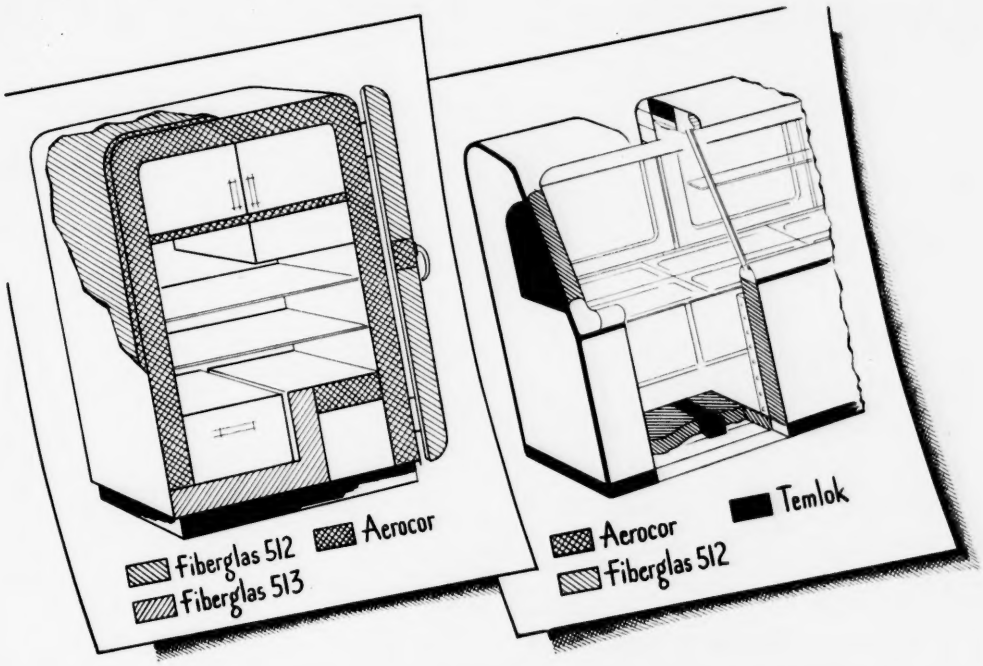


What's the best insulation for sealed equipment?

In equipment of sealed construction, in which both inner and outer shells are impervious to air and moisture penetration, the most widely used insulation is Fiberglas*. Fiberglas is inexpensive, will not settle and pack down, can be readily fabricated to any size and shape, and easily handled on the production line.

But most important of all, this insulation is made in a selection of conductivities and densities. This allows great design flexibility. For example, it is often possible to use one basic cabinet type, without structural or mechanical changes, for different temperature services by merely changing the types of Fiberglas used.

The flexibility of the Fiberglas line also often allows reduction of insulation thickness and increased interior dimensions without change in the dimensions of the outer shell.

Armstrong's Corkboard and Temlok® Insulation also are often used in sealed equipment when their strength and load-bearing characteristics improve design. By using these materials to carry the weight under load-bearing bottoms, heavy structural members can often be omitted and insulating efficiencies increased. Some manufacturers insulate bottoms entirely with Corkboard or Temlok, while others use them in strips, with Fiberglas between.

Sometimes Temlok sheets are used behind the outer shell in sealed equipment. Here they add strength and rigidity to the design and guard against indentation and buckling. Fiberglas batts are then placed between the Temlok and the liner.

Selecting the proper materials to give you best results at lowest cost is often a difficult problem. That's why it pays to contact Armstrong whenever you're planning any insulation job. We offer you a complete line of top-quality insulating materials and the technical advice of an Armstrong engineer. His thorough knowledge of insulations—their performance standards and uses in equipment design—can help you. In addition, you may take advantage of our Life Test Room to performance-test your unit. A few weeks here are equal to five years in actual use.

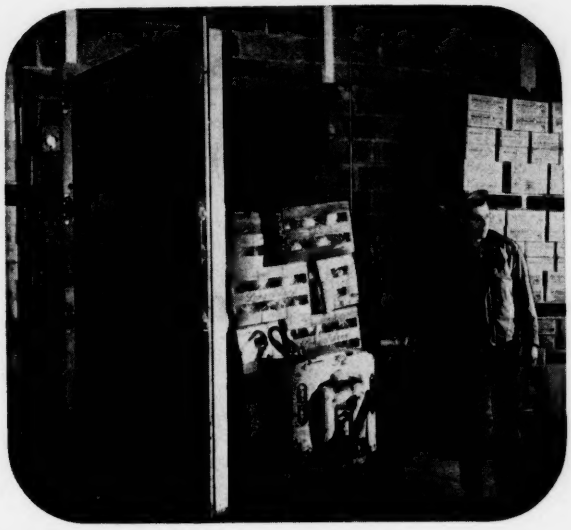
For further information on this complete insulation service, just call your near-by Armstrong office or write direct to Armstrong Cork Company, 4502 Queen Street, Lancaster, Pennsylvania.

*® OCFCorp.

ARMSTRONG'S EQUIPMENT INSULATION

LK CORKBOARD • FIBERGLAS • TEMLOK

JAMISON doors speed food handling at Grand Union Warehouse



Installation at New Warehouse of Grand Union Company, Carlstadt, New Jersey.

WIDE OPENING FOR EASY HANDLING OF HAND TRUCKS

Exclusive Jamison Adjustoflex Hinges equipped with ball bearings, provide support with easy movement for the 6′x 9′ Door.

AMPLE HEIGHT FOR PASSAGE OF ELECTRIC TRUCKS

Monopanel construction of door gives greater rigidity and maintains seal.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

Request Catalog No. 3 for details and specifications.
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